Colstrip to Lame Deer; FAP 37, Lame Deer to Ashland to Broadus; FAS 566, Ashland to Montco Mine; FAS 484, Junction with FAP 37 to Coal Creek and Otter Creek Mines; and unnumbered road, Ashland to the proposed Cook Mountain Mine. These roads also were identified in the 1985 TRRC EIS as roads likely to experience traffic increases.

Since 1980, the MDOH has undertaken three major improvement projects on the two primary highways listed above as potentially impacted roadways, FAP 37 and FAP 39. In 1989 MDOH repaved a 7.9-mile segment from Mile Post 69.5 to Mile Post 77.4 on FAP 37. This project was located east of Ashland, outside the Northern Cheyenne Indian Reservation. The MDOH repaved a nine-mile segment of FAP 39 from Mile Post 4.23 to Mile Post 13.3 and reconstructed a 5.7-mile segment from Mile Post 21.4 to Mile Post 27.1, north of Lame Deer, in 1987.

The remainder of the segments on FAO 37 and FAP 39 have not experienced any long-term improvements since the completion of the 1985 TRRC EIS. The improvements identified in that document as required for FAP 37, thus, would continue to be necessary. No improvements for FAP 39 were identified in the 1985 analysis. Since the FAP 37 is under the jurisdiction of the State of Montana, improvement costs would be taken from the MDOH budget. The cost of improvements has increased to a total cost per mile of $750,000 for the reconstruction/repavement of a rural two-lane highway. Table 4-20 presents costs for the FAP segments identified as needing improvement.

Because segments of FAP 37 and FAP 39 are located within the Northern Cheyenne Indian Reservation, the Northern Cheyenne Tribe has a special interest in any mining-related increases in traffic on the two roads. Both roads within the reservation have a low sufficiency rating based on the condition of the road, capacity, and safety. Their low rating is of special concern since school buses frequently use the roads. An additional concern is the intersection of FAP 39 and FAP 37 at Lame Deer, considered to be a major traffic hazard during the winter months. Segments of the reservation's primary highways have been scheduled for resurfacing and/or reconstruction in the mid-1990s, subject to the MDOH's priorities and funding availability.

Table 4-19. Average Daily Highway Totals.

ROAD SEGMENT	MEAN ADHT[1] 1985 1989	BASELINE/BASELINE + IMPACT ADHT 1995	2000	2005	2010
FAP 37					
Junction I-90 to Lame Deer					
Baseline	1,839	1,957	2,084	2,204	2,292
Impact		1,995	2,206	2,333	2,480
Lame Deer to Ashland					
Baseline	1,146	1,243	1,351	1,458	1,550
Impact		1,038	1,612	1,653	2,199
Ashland to Junction w/Otter Creek Road Road to Mines 2 & 3 (FAS 484)					
Baseline	878	897	917	937	959
Impact		1,038	1,612	1,653	2,199
Junction w/Otter Crk Rd. Road to Mines 2 & 3 (FAS 484) to Broadus					
Baseline	703	668	629	600	592
Impact		731	834	818	909
FAS 484					
Otter Crk Rd. FAP 37 to Mines 2 & 3 (FAS 484)					
Baseline	134	NA	NA	NA	NA
Impact		00	308	302	682
UNLOCATED MINE ROAD					
Ashland to Road XX to Mine 5					
Baseline	NA	NA	NA	NA	NA
Impact		0	308	302	426
FAP 39					
Forsyth (I-94) to Colstrip					
Baseline	1,386	1,400	1,372	1,360	1,393
Impact		1,441	1,554	1,581	1,686
Colstrip to Lame Deer					
Baseline	803	865	926	982	1,027
Impact		981	1,306	1,391	1,633
FAS 566					
Ashland to Montco					
Baseline	218	222	228	233	239
Impact		545	695	767	817
Birney to Montco					
Baseline	135	122	118	114	117

Table 4-19. Average Daily Highway Totals.

ROAD SEGMENT	MEAN ADHT[1] 1985 1989	BASELINE/BASELINE + IMPACT ADHT 1995	2000	2005	2010
Impact		142	181	181	216
Birney South (Junctions w/FAS 314)					
Baseline	70	64	61	59	60
Impact		70	83	82	94
Four Mile Bifurcation to Junction w/FAS 314					
Baseline	84	76	73	71	72
Impact		82	95	94	106
Tongue River Reservoir Bifurcation to Junction w/FAS 314					
Baseline	84	76	73	71	72
Impact		82	95	94	106
FAS 314					
Four Mile Bifurcation's Junction w/FAS 314, to Decker					
Baseline	527	536	548	561	573
Impact		563	586	604	624
Decker to Sheridan					
Baseline	801	814	832	850	868
Impact		858	894	921	952
NORTHERN CHEYENNE ROADS[2]					
Birney Village to Ashland					
Baseline	200	231	253	275	297
Impact		265	342	369	430
Birney Village to Lame Deer					
Baseline	215	258	291	324	352
Impact		270	312	345	381

[1] Cromer 1990; 1992.
[2] ADHT from BLM 1988:48. The calculated increases in traffic for the two Northern Cheyenne roads do not include estimates of mine trips.

Table 4-20. Potential Highway Improvement Requirements.

HIGHWAY	SEGMENT	MILEAGE PROJECTED TO NEED UPGRADING	COST TO UPGRADE [a]
Primary			
FAP 37 [b]	MP 79.2 to MP 82.4	2.2	1.7
Subtotal		3.7	2.8
Secondary			
FAS 484	U.S. 212 to Otter Creek/Coal Creek Mines	6.2	4.7
FAS 566	Ashland to Montco Mine	6.6	4.9
Unnumbered Road	Ashland to Cook Mtn. Mine	2.8	2.1
Subtotal		15.6	11.7
TOTALS		19.3	14.5

[a] 1990 $000,000s, (Larson and Wims 1990).
[b] Segments identified in the 1985 TRRC EIS (p. A3-39 of 1983 DEIS).

Two additional roads on the Northern Cheyenne Indian Reservation -- administered by the Tribe and the BIA -- would require improvements if traffic increases substantially: 1) the Birney Village to Ashland road and 2) the Birney Village to Lame Deer road. The Birney Village to Lame Deer road is particularly deficient and, as of 1989, was in need of resurfacing. The Tribe and the BIA -- the parties required to pay for any improvements to the two roads -- have scheduled it for resurfacing when time and money is available.

Some secondary roads leading to and from potential mine sites off the reservation could require improvement because of increased traffic if the Montco Mine and other mines in the Ashland area are developed. Since these roads are unpaved, they would principally require paving when the mines they serve come into production.[6] The road leading to the Montco Mine would require paving by the first year of mining. For the roads leading to the remaining Ashland mines, pavement would be required as early as the year 2000. The cost of improving these roads to paved roadways is estimated at $750,000 per mile.

Downline Highway Traffic Impacts

Current coal production levels would not result in a significant increase in the numbers of coal trains used in the 1985 analysis of downline impacts. TRRC estimates, however, that little, if any, coal traffic originating from its railroad would move west. Since train numbers used in the present environmental review are not significantly different from

[6] The TRRC DEIS (1983:A3-35) identified a threshold of 300 vehicles per day as the amount of traffic required before pavement of a secondary road is necessary.

those of the 1985 TRRC EIS, the downline highway traffic impacts analysis of the original EIS remains applicable.

The 1985 TRRC EIS identified the urban areas of Spokane in state of Washington, Billings, Montana, and Fargo, North Dakota/Moorhead, Minnesota as experiencing possible impacts from the increase of coal traffic on rail lines running through their communities. Since little traffic is expected to move west from Miles City, this review of downline impacts associated with TRRC trains has focused on the communities east of Miles City. We have sought to determine if any measures to mitigate community and railroad conflicts have been undertaken since the 1985 analysis.

Local officials in Fargo and Moorhead were contacted to determine if grade-separated crossings have been constructed in their communities. The 1985 TRRC EIS identified the lack of grade-separated crossings in these communities as the root of many community problems attributed to train traffic. Inadequate crossings, where passing trains frequently blocked at-grade crossings, not only resulted in delays to general vehicles, including emergency vehicles, but the inadequate access also resulted in severing one part of a community from another. Officials suggested that a grade-separated crossing would mitigate vehicle delays and community severance problems.

Moorhead would experience the most serious impacts because it is divided nearly in half by a rail line. With no grade-separated crossings as of 1981, the residents of the community complained of delays, emergency service problems, the potential for vehicle/train accidents, the disruption of the transit system, and the separation of the business district from the main residential area. Since then, a grade-separated crossing has been constructed at 21st Street on the east side of the community. Grade crossing predictors also have been installed to facilitate the flow of train traffic through the town. Train traffic, however, could become a focus of future community concern, since the nearby Dilworth freight terminal has expanded its holding capacity for container freight.

The community of Fargo, North Dakota also has recently constructed a grade-separated crossing at 25th Street. As train traffic and consequent vehicle delays increase over time, the crossing on 45th Street could require upgrading from an at-grade crossing to a grade-separated crossing.

4.4 SAFETY

The principal safety concerns related to the proposed Extension are the potential for accidents between trains and vehicles at grade crossings and the potential for train derailments. An additional safety concern is the lack of emergency services in the project area.

4.4.1 Construction

Residents of the project area would experience only minimal safety impacts during the construction of the proposed rail line. Most safety concerns would involve possible injury to construction workers undertaking dangerous jobs, such as heavy equipment operation.

Materials which would be used or transported during the construction period would be limited to petroleum products such as gas, diesel fuel, lubricating oil, and solvent. These materials and petrochemicals represent the kinds of products usually associated with construction projects. Precautions would be taken to store all construction materials on land to prevent their entry into area waterways or wetlands. Equipment operators would transport and handle fuels in such a manner to prevent dumping or spilling. Petroleum products in particular would be marked for careful handling to prevent their entry into the water. TRRC would undertake the transportation of any hazardous material in full compliance with the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.).

4.4.2 Operation and Maintenance

The safety impacts associated with the operation of the proposed Extension include the possible occurrence of train/vehicle collisions at the 17 private road crossings and 10 public road crossings, as well as the potential for train derailments on the proposed rail line. Emergency service impacts might also occur because of the railroad's crossing of public roads.

Safety concerns also require the identification of hazardous chemicals and materials which would be used or transported by TRRC. Mitigation of the safety hazards necessitates plans for their handling, storage and clean-up in the event of spillage.

4.4.2.1 Grade-Crossing Accidents

The calculation of railroad and vehicle collisions at-grade crossings was based on an equation developed in the 1985 TRRC EIS. The equation, developed as part of the National Cooperative Highway Research Program, was based on three factors: 1) daily train traffic figures assumed for the analysis period; 2) daily vehicle traffic projected to occur on affected roadways throughout the analysis period; and 3) the effectiveness of different types of crossing-warning devices planned for the various crossings.[7]

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[7] The methodology is referenced in the Highway Research Board, National Research Council, National Academy of Sciences, *Factors Influencing Safety at Highway/Rail Grade Crossings*, National Cooperative Highway (continued...)

The variables in the equation are constant for all the rail/roadway crossings on either TRRC's preferred alignment or the Four Mile Creek Alternative (i.e., crossings 1 - 3 for the preferred alignment and the Four Mile Creek Alternative; crossings 4-10 for the preferred alignment; and crossings 11-15 for the Four Mile Creek Alternative).[8] Train speeds are estimated to be constant at 50 MPH.

The findings of the equation, assuming two different types of crossing-warning devices, are reported in Table 4-21. Accidents would occur at a rate of not more than one every 100 years at the crossings equipped with crossbucks. At crossings equipped with stop signs, the same rate of accident occurrence could be predicted until the year 2005. From that year and until the end of the analysis period, not more than two accidents would occur in a 100 years. Accidents over the entire analysis period would number no more than one,

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[7](...continued)
Research Program Report Number 50, Washington, D.C., 1968, pp. 59-62. The equation is: EA = (A) (B) (ADTT), whereas

EA = expected annual accidents at a crossing; A = an empirically derived factor, associating traffic volumes with accident frequency; B = an empirically derived factor, representing the relative effectiveness of various types of crossing-warning devices ADTT = average daily train traffic.

[8] The only factor that potentially could differ from crossing to crossing is ADHT, which, in the case of the 15 crossings considered for the preferred alignment and the Four Mile Creek Alternative, is translated to only one value under the list of "A" factors. (See "a" below.) The values of the remaining two factors in the equation are discussed under "b" and "c" below.

a. The "A" Factor:

	1995/1996	2000	2005	2010
ADHT for Crossings 1-3, preferred alignment, and Four Mile Creek Alternative	142	181	181	216
ADHT for Crossings 4-10, preferred alignment, and Crossings 11-15, Four Mile Creek Alternative	82	95	94	106

All the ADHT figures are below 250 and, according to the table in the TRRC DEIS (1983:A7-2), would translate to an A Factor of .000347.

b. The "B" Factor:

Given the two possibilities of crossing-warning devices at the TRRC crossings, the equation was worked using two values, as presented in the table in the 1983 TRRC DEIS on p. A7-2: 1) the maximum value of 4.51 for "Stop signs, highway volume less than 500 per day" (with no adjustment); and 2) the value of 3.89 for "Crossbucks, highway volume less than 500 per day."

c.	1995/1996	2000	2005	2010
ADTT	8	8	10	10

regardless of the use of crossbucks or stop signs. Since no additional coal would be transported over either TRRC's preferred alignment or the Four Mile Creek Alternative under the estimated high scenario, the accident rates would not change.

Table 4-21. Projected Accident Rates.

I. STOP SIGN CROSSING	1996	2000	2005	2010	
A = .003347 B = 4.51					
ADTT	8.	8.	10.	10.	
FINDING: EA	.0125	.0125	.0156	.0156	
CUMULATIVE 5-YRS	.0535	.0535	.0675	.0135	
CUMULATIVE TOTAL:					.2186
II. CROSSBUCKS CROSSING					
A = .000347 B = 3.89					
ADTT	8.	8.	10.	10.	
FINDING: EA	.0107	.0107	.0135	.0135	
CUMULATIVE 5-YRS	.0535	.0535	.0675	.0135	
CUMULATIVE TOTAL:					.188

4.4.2.2 Emergency Services

A major safety concern with any public road crossings by railroads is restricted access for emergency vehicles. Ambulances traveling from Sheridan, Wyoming, in response to medical emergences could experience the same delays as other vehicles crossings the rail line and FAS 566 or FAS 314. Fire response calls from either Ashland or Decker also could be delayed, if a passing train temporarily blocks a crossing. The effect of delays experienced by emergency vehicles remains the same as that assessed in the 1985 TRRC EIS. The percentage of medical emergencies in which a delay would be critical should be small. A delayed response to fire emergencies, on the other hand, could mean an increase in property losses.

4.4.2.3 Mitigation Measures

The impact of vehicle collisions or emergency service delays would be most effectively mitigated by upgrading the crossing's warning devices or constructing a grade separated crossing. The analysis pertaining to crossing improvements is addressed in Section 4.3.2.1.

4.4.2.4 Derailments

An estimate of derailments that might occur on TRRC's preferred alignment and the Four Mile Creek Alternative is based on a derailment rate of 1.66 per million train-miles and on the number of train-miles estimated for either route.[9] The estimate of train-miles is derived by multiplying daily trains by train miles and by the number of operating days in a year. Table 4-22 provides the train-mile estimates for TRRC's preferred alignment. The number of derailments projected to occur along TRRC's preferred alignment is presented in Table 4-23. Based on these projections, only three to four derailments may occur along the preferred alignment during the analysis period of 1996 through 2010.

Table 4-22. Train-Miles for TRRC's Preferred Alignment.

	Train Numbers	Extension Miles	Operating Days	Estimated Train Miles	
1996	4 x 2 = 8	40.87	365	.119	
2000	4 x 2 = 8	40.87	365	.119	
2005	5 x 2 = 10	40.87	365	.149	
2010	5 x 2 = 10	40.87	365	.149	
Cumulative Total					2.084

Table 4-23. Train Derailments for TRRC's Preferred Alignment.

	Estimated Train Miles	Derailment Rate	Derailment Numbers
1996	.119	1.66	.198
2000	.119	1.66	.198
2005	.149	1.66	.247
2010	.149	1.66	.247
Cumulative Total	2.084	1.66	3.459

The Four Mile Creek Alternative likely would experience a similar number of derailments -- just over four during the entire analysis period. Tables 4-24 and 4-25 provide the number of train miles and derailments calculated for this alternative.

[9] The derailment rate was obtained from Corporate Strategies, Inc., which presented the rate as a range, one accident every 600,000 to 1,000,000 miles. The worst case rate was used in this analysis (CSI 1990).

Table 4-24. Train-Miles for the Four Mile Creek Alternative.

	Train Numbers	Extension Miles	Operating Days	Estimated Train-Miles
1996	4 x 2 = 8	51.3	365	.15
2000	4 x 2 = 8	51.3	365	.15
2005	5 x 2 = 10	51.3	365	.187
2010	5 x 2 = 10	51.3	365	.187
Cumulative Total				2.622

Table 4-25. Train Derailments for the Four Mile Creek Alternative.

	Estimated Train Miles	Derailment Rate	Derailment Numbers
1996	.15	1.66	.249
2000	.15	1.66	.249
2005	.187	1.66	.310
2010	.187	1.66	.310
Cumulative Total	2.622	1.66	4.353

The potential for injuries and fatalities associated with train derailments was estimated according to the same procedure used in the 1985 TRRC EIS. The maximum cumulative numbers of derailments for either TRRC's preferred alignment or the Four Mile Creek Alternative resulted in estimates of less than one injury or fatality during the entire analysis period. The assumptions, 0.060 injuries and 0.003 fatalities per derailment, translated into .24 injuries and .012 fatalities for the four derailments projected to occur along either the proposed or the alternative routes. Any injuries or fatalities that might occur during a derailment should primarily involve TRRC employees.

Estimated in 1990 dollars, the property damage associated with the four derailments of either the preferred alignment or the Four Mile Creek Alternative could cost a total of one million dollars. The estimate is based on a figure of $250,000 per derailment, which would reflect the equipment and track damage in an accident involving 10 to 20 train cars. TRRC would be the predominant party to experience the losses.

The likelihood of derailments on TRRC's preferred alignment or on the Four Mile Creek Alternative would be reduced by the following mitigation measures:

1) new track, new material, new alignment and new grade;
2) good equipment maintained to high standards;
3) a high level of employee training and safety awareness;
4) frequent track inspections;
5) a single type of train operations (i.e., empty unit trains operating in one direction and loaded unit trains operating in the other direction); and
6) the installation of guard rails (i.e., additional rails in the center of the track to keep derailed wheels in line) on railroad bridges

4.4.2.5 Railroad Grade Concerns

TRRC's preferred alignment poses no difficulty with regard to the operation of trains on the grade currently engineered. The present engineering plan for the Four Mile Creek Alternative, however, includes a 2.3 percent grade extending a distance of 3.8 miles. The safe descent of trains on this grade would require rigid operating rules for the control of train speeds. Seven locomotives, operating with full dynamic braking under very heavy brake application, would be needed to hold train speeds to no more than 10 miles per hour. If speeds exceeded 15 miles per hour or more, the engineer could lose control of the train.

The need for seven locomotives to maintain an appropriate operating speed is a safety concern for the Four Mile Creek Alternative. TRRC has indicated that this requirement would also pose an operational burden, since TRRC would have to maintain four additional locomotives at the start of the downgrade at Four Mile Creek.

4.4.2.6 Hazardous Chemicals and Materials

Because TRRC plans to principally transport coal, any potentially hazardous chemicals and materials would be those associated with its operation of the railroad as a coal transport. Petrochemicals, such as diesel fuel and lubricants, would be the primary materials involved in operating a train.

The TRRC would be a common carrier railroad, and thus could transport materials other than coal. However, TRRC is not aware of any plans to haul hazardous materials or chemicals over its line. In the event that TRRC sould decide to transport these types of materials, TRRC has stated that it would undertake the plans and procedures required by state and federal laws to insure their safe handling and storage. TRRC also would operate in full compliance with the Hazardous Materials Transportation Act (49 U.S.C. 1080 et seq.).

4.4.3 Related Actions

The estimates for grade-crossing accidents and derailments are related to TRRC's projection of train-miles and increased vehicle traffic. These factors are dependent upon the total coal production from the Decker and Spring Creek mines and from the Ashland-area mines. As discussed earlier, the high scenario of coal production would not alter the estimated accident rates for the crossings of TRRC's preferred alignment or the Four Mile Creek Alternative with public roads.

4.5 ENERGY

The construction of the proposed Extension and the operation of trains on the proposed rail line would affect the use of energy in the project area. The anticipated net energy impact was determined by estimating the amount of energy that the anticipated coal mines would produce and then comparing that figure with the amount of energy that would be consumed in the construction and operation of the railroad and the mines. A net energy balance was calculated in terms of British Thermal Units (BTUs).

The net energy impact was calculated not only for TRRC's preferred alignment and the Four Mile Creek Alternative, but it also was recalculated for the permitted alignment from Miles City to Terminus Point 1. The recalculation is necessary because of the reduction of cubic yards of material moved during the construction of the permitted line and because of the proposed configuration changes in trains -- not only the trains originating from the Decker and Spring Creek mines but also the trains originating from the Ashland area mines. The lesser amount of earthwork required for the construction of the alignment from Miles City to Ashland reflects a refinement of TRRC construction plans including the exclusion of the Ashland SE alignment. Train configuration changes are attributed not only to changes in projected coal haulage but also to TRRC's desire for efficient operation.

4.5.1 Construction

The estimated energy that would be consumed in the construction of TRRC's preferred alignment focused on the fuel that would be consumed by earthwork activity. Constructing the 42 miles of rail line from Ashland to Decker and Spring Creek would move 10,217,626 cubic yards of earth. Fuel consumption by heavy equipment is estimated at .15 gallons of diesel fuel per cubic yard of material moved. Thus, the construction of TRRC's preferred alignment would require 1,532,644 gallons. Converted to BTUs, assuming one gallon of diesel fuel equals 138,700 BTUs, the fuel figure becomes 212,577,7-22,800 (.213 x 10^{12}) BTUs.

The current estimate of 10,688,313 cubic yards of earthwork would result in an energy consumption for the construction of the permitted line, calculated as 1,603,247 gallons or 222,370,358,900 (.222 x 10^{12}) BTUs. The amount of earthwork activity that would be required in the construction of the rail line with the Four Mile Creek Alternative would total 12,402,000 cubic yards of material. Using the heavy equipment fuel consumption figure of .15 gallon per cubic yard of material moved, the fuel consumption associated with the Four Mile Creek Alternative would be calculated at 1,860,300 gallons. Converted to BTUs the figure would be 258,023,610,000 (.258 x 10^{12}) BTUs.

4.5.2 Operation and Maintenance

The proposed Extension and already-approved line between Ashland and Miles City would serve existing mines of East and West Decker and Spring Creek, Montco and three Ashland-area mines, as well as mines in Wyoming's Powder River Basin. The cumulative haulage from these existing mines is expected to total 291 million tons, or 5,005.2 trillion (5,005.2 x 10^{12}) BTUs. With the addition of 118 million tons from the Ashland mines, the permitted line would haul a cumulative total of 409 million tons from Ashland to Miles City. This figure represents just over 7,034.8 trillion (7,034.8 x 10^{12}) BTUs.[10]

The largest amount of energy consumed by a railroad is the diesel fuel required to operate trains. Here, each train would be comprised of three 3,000-horsepower locomotives, capable of hauling a 12,000-net-ton load. TRRC plans to operate trains 365 days a year.

The method used to determine train fuel consumption first required data on projected fuel use by each train, empty or loaded, operating on two different segments -- TRRC's preferred alignment and the permitted rail line. Corporate Strategies, Inc., provided fuel consumption rates for empty and loaded trains traveling between Miles City and Spring Creek and for empty and loaded trains traveling between Miles City and the Ashland-area mines. The fuel consumption figures then were extrapolated for empty and loaded trains traveling on the preferred alignment between the Ashland mines and the Decker and Spring Creek mines.

Once the fuel use for one empty and one loaded train was determined for TRRC's preferred alignment and for the permitted rail line, the figures were added together to determine the fuel use for one round trip on each segment. Based on this methodology, one round-trip on the preferred alignment between Decker/Spring Creek and Ashland would use 1,039 gallons. One round-trip on the already-permitted line between Ashland and Miles City would use 1,373 gallons. A daily fuel use figure for each segment was then

[10] A BTU content of 8,600 per pound of coal was assumed in making the calculations.

calculated by multiplying the pertinent round-trip fuel figure by the number of daily trains expected to be operating on each segment during the 15-year analysis period. Multiplying the daily fuel use by the number of operating days in a year, assumed here as 365, produced annual fuel consumption figures. Fuel calculations are presented in Table 4-26, Fuel Consumption by Trains. If the high scenario of coal development (i.e., 44 million tons by the year 2010) is assumed, the fuel consumption figures for the permitted line would increase by 11 percent for that year. The fuel consumption figures for the preferred alignment, on the other hand, would remain constant since the additional coal expected with a high production scenario would not be hauled over the proposed Extension.

Cumulative train fuel use was determined by adding up the annual fuel consumption figures throughout the analysis period. It was calculated that trains operating on the preferred alignment would consume a cumulative total of 26,546,450 gallons, or 3.68×10^{12} BTUs. Trains operating on the permitted line would consume a cumulative total of 49,613,355 gallons, or 6.88×10^{12} BTUs.

The Four Mile Creek Alternative would serve the same mines as those of the proposed Extension -- i.e., existing mines of East and West Decker and Spring Creek, as well as mines in Wyoming's Powder River Basin. The cumulative amount of coal to be transported along the alternative route would remain the same -- a total of 291 million tons, or 5,005.2 trillion BTUs.

Most of the energy consumed by the railroad's operation on the Four Mile Creek Alternative would be the diesel fuel required to operate trains. The Four Mile Creek Alternative would require 50 percent more fuel to operate. Daily and annual fuel use of the trains operating on the Four Mile Creek Alternative is presented in Table 4-26. The fuel consumption figures would remain unchanged under the high coal production scenario since the additional coal associated with the high scenario would originate from the Ashland-area mines and would not require transportation along the alternative. Cumulative train fuel use during the analysis period would be 39,818,580 gallons or 5.52×10^{12} BTUs.

4.5.3 Downline Operations

TRRC changes regarding estimates in coal production and train numbers required the recalculation of projections on the amount of fuel that would be consumed by the downline movement of TRRC trains. In the 1985 TRRC EIS the amount of fuel used by the downline TRRC trains was estimated by employing a factor for fuel consumed per net ton-miles, i.e., 0.0022 gallons per net ton-mile, and by using a weighted average length for a round trip on the downline corridors, i.e., 852 miles.

Multiplying the coal production figures projected during the analysis period by the average length of a round trip provided the ton-miles of coal hauled. The ton-mile figures then were multiplied by the net-ton fuel consumption factor of 0.0022 to determine downline fuel consumption. Table 4-26 provides the downline fuel use that would be associated with the tonnage hauled on the proposed Extension, with or without the Four Mile Creek Alternative, and with the total tonnage hauled on the permitted line. The annual figures for the two sets of downline fuel use were added to produce cumulative figures, as follows: for downline fuel use of tonnage associated with the proposed Extension -- 545,450,400 gallons, or 75.7 x 10^{12} BTUs; and for downline fuel use of total tonnage hauled the permitted line -- 766,629,600 gallons, or 106 x 10^{12} BTUs.

Table 4-26. Fuel Consumption by Trains (gallons).

	1996	2000	2005	2010
Proposed Extension (Ashland area-Decker/Spring Creek)				
Number of Trains (round trips)	4	4	5	5
Daily Fuel Consumption	3,460	3,460	4,325	4,325
Annual Fuel Consumption	1,262,900	1,262,900	1,578,625	1,578,625
Annual Downline Fuel Consumption	28,116,000	33,789,200	39,362,400	39,362,400
Permitted Line (Miles City-Ashland)				
Number of Trains (round trips)	5	6	7	9
Daily Fuel Consumption	7,735	9,282	10,829	13,923
Annual Fuel Consumption	2,823,275	3,387,930	3,952,585	5,081,895
Annual Downline Fuel Consumption	31,864,800	48,734,400	58,106,400	73,101,600
Proposed Extension Assuming Four Mile Creek Alternative (Ashland area-Decker/Spring Creek)				
Number of Trains (round trips)	4	4	5	5
Daily Fuel Consumption	5,190	5,190	6,488	6,488
Annual Fuel Consumption	1,894,350	1,894,350	2,368,120	2,368,120

4.5.4 Burlington Northern

Burlington Northern Railroad (BN) presently operates 20 round trips a week on its Decker/Spring Creek to Sheridan segment and 14 round trips a week on its Gillette-Sheridan segment. Calculated on a daily basis, the BN runs about 3 round trips a day between the Decker and Spring Creek mines and Sheridan and about 2 round trips a day between Gillette and Sheridan. The Decker/Spring Creek trains travel about 31 miles to Sheridan; the Gillette trains travel about 98.6 miles to Sheridan. All of the trains, including those originating at Decker/Spring Creek and those originating at Gillette, travel from Sheridan north to Forsyth and then to Miles City, a distance of nearly 300 miles.

According to TRRC's operating plan, TRRC anticipates that all current coal traffic now moving over BN's Decker/Spring Creek-Sheridan line and that coal traffic from at least one of BN's trains currently operating on the Gillette-Sheridan segment would instead move over TRRC's proposed line from Decker to Miles City. In other words, coal from the Decker/Spring Creek mines south to Sheridan would instead move north on TRRC's proposed Extension to Ashland and then along the permitted line to Miles City. Similarly, coal from at least one of BN's trains now operating between Gillette and Sheridan would be diverted at Dutch, the connection just east of Sheridan, and then travel north on BN's line to the Decker and Spring Creek mines where it would move onto the TRRC line.

The amount of fuel currently consumed by BN trains to transport to Miles City the coal originating from the Decker and Spring Creek mines and from Gillette would be reduced if TRRC transported the same coal to Miles City on TRRC's preferred alignment and on the already-permitted line. Assuming that a round-trip train would consume 8,000 gallons on the BN segment from Decker/Spring Creek to Sheridan to Forsyth to Miles City, the daily amount of fuel consumption is estimated at 32,000 gallons.[11] The daily fuel use figure translates into an annual fuel use figure for the BN trains of about 11 million gallons. This fuel use figure is considerably more than the estimates for the total annual fuel consumption for the same trains using the TRRC line -- moving over the preferred alignment plus the already-permitted line -- 4,022,665 gallons. If the same trains operated on the Four Mile Creek Alternative, the total fuel consumption of the trains would equal 4,781,135 gallons.

The difference in fuel use is explained when the distances of the BN line and the TRRC line are compared: the trains operating on the BN line travel more than 300 miles to arrive at Miles City, while the trains that would operate on the TRRC line would travel between 120 and 140 miles.[12] The fuel consumption reflects the 40 percent difference in length between the BN and the TRRC lines.

4.5.5 Related Actions

The focus of the analysis regarding energy that would be consumed in the construction of mines served by the proposed Extension has been the construction of the four new mines in the Ashland area -- the proposed Montco Mine and the potential mines of Cook Mountain, Coal Creek, and Otter Creek. No new construction in conjunction with the Decker and Spring Creek mines is anticipated.

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[11] This calculation fails to include the amount of fuel consumed by the Gillette-originated train between Gillette and Sheridan and, thus, slightly underestimates BN fuel use (CSI 1990).

[12] The upper range is given here, because one round-trip train originates in Gillette and must travel about 23 miles on the BN line from Dutch (Sheridan) to the TRRC connection at Decker/Spring Creek.

The assumptions outlined in the 1985 TRRC EIS regarding energy use during mine construction were applicable here. Energy used to construct potential mines would include the diesel fuel consumed by bulldozers and scrapers and the diesel fuel expended by cranes and welders in facility erection. Miscellaneous mine construction activities also were included in the energy consumption estimates. It is estimated that four million gallons of diesel fuel would be consumed to construct each mine. Thus, a total of 16 million gallons would be used to establish all four mines. The BTU equivalent of this amount is 2.22 trillion (2.22×10^{12}) BTUs.

The estimate of energy consumed in mining operations is based on the assumption that the mines would be truck-shovel operations with a stripping ratio of 4.5:1. An average of 4.5 yards of overburden would be removed for each ton of coal mined.

Electricity use and diesel fuel consumption have been estimated as a function of the tonnage mined. Anticipating that about 1.2 kilowatt hours of electricity would be consumed for each ton of overburden removed and assuming the stripping ratio of 4.5:1, it has been determined that 5.4 kilowatts of electricity, or 18,425 BTUs, would be required for each ton of coal mined. Again assuming a stripping ratio of 4.5:1, it is estimated that one gallon of diesel fuel, or 138,700 BTUs, would be required to mine each ton of coal. A total factor of 157,125 BTUs of energy consumed for each ton of coal mined was determined by combining the electricity and diesel fuel consumption rates. Multiplying this factor by the cumulative coal production figure of 409 million tons resulted in the estimate of 64.3 trillion (64.3×10^{12}) BTUs of energy consumed in mining operations.

4.5.6 Energy Balance

4.5.6.1 Energy Balance of the Proposed Extension

The energy balance for the proposed Extension and the already-permitted rail line is summarized in Table 4-27. The energy production associated with the proposed Extension would exceed the energy consumed during the extension's construction and operation by about 35 times. Less than three percent of the energy produced as a result of the proposed Extension would be consumed by the rail line's construction, railroad operation and mine construction.

Table 4-27. Cumulative Figures for Energy Consumption and Production Including Net Energy Balance for the Preferred Alignment, the Permitted Line, and the Four Mile Creek Alternative.

	Preferred Alignment (Ashland Area to Decker/Spring Creek)	Permitted Line (Miles City to Ashland area)	Proposed Extension with the Four Mile Creek Alternative (Ashland Area to Decker/Spring Creek)
I. CONSTRUCTION EARTHWORK (Cubic yards of material moved)	10,217,626	10,688,313	12,402,000
Diesel Fuel Consumption			
(gallons)[1]	1,532,644	1,603,247	1,860,300
(trillion BTUs)[2]	.21	.22	.26
II. OPERATION & MAINTENANCE			
Coal Haulage			
(tons)	291,000,000	409,000,000	291,000,000
(trillion BTUs)[3]	5,005.2	7,034.8	5,005.2
Diesel Fuel Consumption by Trains			
(gallons)	26,546,450	49,613,355	39,818,580
(trillion BTUs)	3.68	6.88	5.52
III. DOWNLINE ENERGY USE			
(gallons)	545,450,400	766,629,600	545,450,400
(trillion BTUs)	75.7	106	75.7
IV. RELATED ACTIONS ENERGY USE			
Construction			
(Gallons)		16,000,000	
(trillion BTUs)	no new construction	2.22	no new construction
Operations			
(tons)	409,000,000	409,000,000	409,000,000
(trillion BTUs)	64.3	64.3	64.3
V. ENERGY BALANCE (trillion BTUs)			
Energy Produced (coal)	5,005.2	7,034.8	5,005.2
Energy Consumed			
Related Actions	64.3	66.52	64.3
Rail line operation	79.38	112.88	81.22
Railroad construction	.21	.22	.26
Total	143.89	179.62	145.78
Net Energy Balance	4,861.31	6,855.18	4,859.42

[1] Assumption of .15 gallons of diesel fuel consumed per one cubic yard of material moved (Hadley, June 18, 1990).
[2] One gallon = 138,700 BTUs.
[3] BTU content of 8,600 per pound of coal.

Regardless of the changes in construction and operation plans now being considered for the already-permitted line, the energy balance for the line between Miles City and Ashland would remain the same as that reported in the 1985 TRRC EIS. The amount of energy produced as a result of the rail line construction would continue to exceed the amount consumed by nearly 40 times. Less than three percent of the energy produced

would be consumed by the rail line construction, railroad operation and mine development.

The construction and operation of the Four Mile Creek Alternative would consume about 4 trillion (4×10^{12}) more BTUs than the preferred alignment. The energy production associated with the Four Mile Creek Alternative would still be far in excess of energy consumption associated with the railroad -- by about 34 times. Just under three percent of the energy produced as a result of the Four Mile Creek Alternative would be consumed by the rail line's construction, railroad operation and mine construction.

4.6 TONGUE RIVER DAM

4.6.1 Construction Impacts

Construction of TRRC's preferred alignment would occur about one mile from the existing Tongue River Dam. This dam, constructed in 1940, is an earthfill embankment approximately 91 feet high with a crest width of 54.5 feet and a crest length of 1,824 feet. The Tongue River Dam and Reservoir, owned and operated by the State of Montana, serves as a multipurpose project providing water for irrigation, industry, flood control, recreation, and fish and wildlife sustenance. The reservoir has a capacity of 69,400 acre-feet at the spillway crest (elevation 3424.4), which is 18 feet below the dam crest.

The U.S. Army Corps of Engineers' inspection report of the Tongue River Dam for the National Dam Safety Program classified the structure as high hazard. During the flood of May 1978, a discharge of approximately 6,800 cfs in the spillway damaged the spillway to a point where failure seemed imminent. The inflow to the reservoir which caused this flow in the spillway was about 17,500 cfs. The original spillway design flood has a peak inflow of 96,000 cfs. The probable maximum flood (PMF) has a peak inflow of 382,000 cfs.

Following the May 1978 flood, the Montana Department of National Resources and Conservation (DNRC) implemented new operating criteria for the Tongue River Reservoir, which basically required that the reservoir be operated at lower levels to minimize the risk of failure.

The State of Montana, in cooperation with the Northern Cheyenne Indian Tribe and the Bureau of Indian Affairs, is preparing plans to repair and enlarge the Tongue River Dam and Reservoir. Congress has recently appropriated money to continue rehabilitation studies of the dam. The plan most likely to be implemented if funds are available will be to raise the water level by 4 feet, to elevation 3428.4, and to enlarge the spillway to safely withstand a design event of 100,000 cfs. This event is only about 26 percent of the PMF, but would not exceed this level in 1,000 years.

During construction of TRRC's preferred alignment, the only way in which the dam could be affected would be by blasting, which could be required in the 100-foot deep cut located one mile west of the left dam abutment. The Four Mile Creek Alternative would avoid this area entirely. A seismic analysis based on local geology and specific blasting plans would be necessary to quantify the risk to the dam and spillway, but in view of the distances involved, it is unlikely that the dam would be significantly adversely affected. If future studies determine that blasting would pose a risk to the dam, an alternative to blasting would be proposed.

There are three locations, where ephemeral streams enter the Tongue River Reservoir and where railroad construction could encroach on the proposed high water level. Railroad fill placed at these locations would be riprapped to prevent damage from wave action. In the alternative, TRRC could elect to construct trestle bridges across these streams.

4.6.2 Operation and Maintenance

4.6.2.1 Effect of Trains on Dam Stability

During scoping sessions, a concern was raised that vibrations from trains could affect the structural stability of the Tongue River Dam. However, there are numerous instances (e.g., Boysen Dam on the Big Horn River and Glendo Dam on the North Platte River in Wyoming) where railroads are located much closer to dams than TRRC's preferred alignment would be to the Tongue River Dam and yet no vibration problems have been reported.

The most definitive information on this issue is the result of investigations performed by the U.S. Bureau of Reclamation in conjunction with the design and construction of a desalination plant near Yuma, Arizona. During the design phase of that plant, a strong motion earthquake sensing system was installed to collect seismic data on the area. Such systems are frequently used to determine structural responses of dams to earthquake motions. The sensing systems use mechanical and optical instrumentation to record acceleration in three orthoganal directions. An acceleration of 0.05 g (5 percent of the gravitational acceleration) is generally considered significant. This is also the seismic coefficient recommended for use in design of dams in the region which includes the Tongue River Dam.

Typically, strong motion sensors are set to "trigger" at accelerations above 0.01 g. However, at the Yuma site the instrument had to be set within 50 feet of a railroad track. To avoid "nuisance" readings which might be caused by trains, this particular instrument was set to be triggered at an acceleration of 0.03 g. The instrument was never triggered by any of the numerous trains passing within 50 feet. Therefore, it is reasonable to conclude that operation of proposed Extension, which wouldl be at its nearest point about one mile away

from the Tongue River Dam, would not affect the structural stability of the dam.

4.6.2.2 Effect of Railroad on River Flood Levels

The U.S. Bureau of Reclamation (USBR) recently completed a threat to life assessment for the Tongue River Dam. This assessment evaluated the threat to life created by the eight scenarios summarized in Table 4-28. The potential threat to life was determined by empirical equations. The assessment is basically a function of warning time and "population at risk" (PAR). For reaches with an average warning time of less than 15 minutes, the potential threat to life is equal to 0.5 (PAR). Warning times between 15 minutes and 1.5 hours result in a potential threat to life equal to $(PAR)^{0.6}$. Warning times longer than 1.5 hours give a potential threat to life of 0.0002 (PAR). The highest (i.e., worst-case) threat to life situation in Table 4-28 is Scenario 1. Scenario 6 has a threat to life rating of zero.

Scenarios 1 and 5 (see Table 4-28) would result in similar flows immediately downstream from the dam and have similar failure modes. This failure mode (i.e., spillway failure) and discharge at the dam are also quite similar to corresponding values taken from the Montana DNRC's Tongue River Dam Emergency Warning and Evacuation Plan. In that study a peak inflow of 118,000 cfs (31% PMF) and a dam failure occurring when the flow depth in the spillway reached 5 feet resulted in a peak discharge immediately downstream from the dam of about 868,000 cfs (between that of scenario 1 and 5 in Table 4-28). Since inundation maps were not available from the USBR Threat to Life Study, and since the failure modes and peak discharges are available for the USBR and Montana DNRC dam failure studies, the DNRC study was used to evaluate the effects the proposed Extension might have on a flood resulting from failure of the Tongue River Dam.

The HEC-1 model (U.S. Army Corps of Engineers 1988) was used to route a hypothetical inflow hydrograph through the Tongue River Reservoir and through a simulated breach in the dam and then compute streamflow hydrographs at selected downstream locations in the Tongue River valley. Required input data for the HEC-1 routing study included the inflow hydrograph and selected river valley characteristics, including length, hydraulic shape and roughness. USGS 7.5-minute topographic quadrangle maps were used to determine the cross sections necessary to define the shape of the river valley. Breach parameters necessary to simulate the dam failure included the width and elevation of the base of the breach, breach side slopes, the time for breach development and reservoir watersurface elevation at which breaching begins. The DNRC evaluation assumed the worst case scenario of a total dam breach, i.e. breach of the entire Tongue River Dam. The upper level precipitation event as developed for the Tongue River Dam Emergency Warning and Evacuation Plan was used for that study to develop a conservative estimate of the possible extent of flooding.

Table 4-28. Summary of USBR Threat to Life Assessment for Tongue River Dam.

SCENARIO	LOADING CONDITION	MAXIMUM FLOW IMMEDIATELY DOWNSTREAM THROUGH DAM (cfs)	COMMENTS	THREAT TO LIFE RATING
1	100 PMF	886,500	Existing dam and spillway. Dam fails due to spillway failure.	7
2	100 PMF	382,000	Natural flow condition if there were no Tongue River Dam.	5
3	100% PMF	1,203,100	Spillway repaired. Dam fails by overtopping.	2
4	100% PMF	373,100	New spillway. Crest of dam raised.	2
5	6.7% PMF	822,000	Existing dam and spillway. Dam fails due to spillway failure.	6
6	6.7% PMF	25,600	Natural flow condition if there were no Tongue River Dam.	0
7	40% PMF	1,130,900	Spillway repaired. Dam fails by overtopping.	2
8	40% PMF	152,800	Natural flow condition if there were no Tongue River Dam.	1

For the DNRC HEC-1 analysis, streamflow hydrographs were computed using data that describe the existing river basin at 61 cross section locations between the Tongue River Dam and Miles City. To predict the likely effects of the proposed rail line on these hydrographs, a duplicate analysis of the DNRC HEC-1 analysis was established. This duplicate analysis was established as a calibration run to insure consistency. The DNRC analysis employed the 1973 HEC-1 version, while the updated 1988 version was used for this analysis. Following the calibration run, the input data were edited where necessary to reflect changes in the river valley cross sections brought about by the construction of the proposed rail line. Two additional runs were required to accomplish this. First, a run was conducted after adding several cross sections to the original input file. These additional cross sections were added at channel locations that would be specifically affected by the railroad. In this second run, these new cross sections were based on channel cross sections as they exist without the railroad, and this run was simply used to establish new "baseline" conditions with the added cross sections. For the third and final run, selected cross sections were edited where they would be altered by construction of the railroad. The streamflow hydrographs computed in the third run provided an estimate of the maximum flood stage that would result at these cross sections with the Tongue River Railroad in place. The results of the streamflow hydrographs computed in the second and third runs were

compared in order to quantify the effects of the railroad on the maximum flood stage at the respective cross sections. A total of 57 channel and valley cross sections, located between the Tongue River Dam and the point where the proposed railroad exits the Tongue River valley, were used in the second and third model runs.

The HEC-1 dam-break simulation used to prepare the DNRC Tongue River Dam Emergency Warning and Evacuation Plan was performed by R.C. Harlan and Associates, San Francisco, California. This analysis used the 1973 version of HEC-1. The inflow hydrograph, basin cross sectional data and the dam breach characteristics used in the initial simulation were also used by WWC in order to develop a duplicate run using the updated 1988 version of HEC-1. The program input and output formats were completely revised by the HEC (Hydrologic Engineering Center) in the development of the current version. The results from the duplicate run using the 1988 version are comparable to the original results. However, due to minor changes and error corrections in the input data, the maximum stages calculated in the duplicate, or calibration, run are slightly higher than those calculated in the original analysis. However, the calibration run did substantiate the validity of the input and output control data used in the current analysis.

Subsequent dam-break simulations and downstream flood routing calculations were then run using the inflow hydrograph and dam breach data developed for the DNRC study. Maps 1-16 in Appendix B show the locations of the cross sections used for these analyses. These maps were taken from the DNRC report "Tongue River Dam Emergency Warning and Evacuation Plan." The cross sections used in the DNRC report are indicated on these maps along with the cross sections added for this investigation. The railroad alignment along the Tongue River has been added to these maps. Cross sections added for the originally proposed railroad are labeled TR-1 through TR-5 and TR-BR. Cross sections added to evaluate the proposed extension are labeled TR-R1 through TR-R4. In addition, one cross section (SG-1A) was deleted and replaced (SG-1AR) to place it at a proposed railroad bridge location. Maps 1-16 also indicate the extent of land inundation resulting from the upper level precipitation event and failure of the Tongue River Dam as predicted in the original DNRC study.

The HEC-1 dam-break simulation model is limited in that it "assumes that the dam-break hydrograph will not be affected by tailwater constraints and that the reservoir pool remains level" (HEC-1 Flood Hydrograph Package Users Manual 1988). The HEC-1 model fails to provide backwater calculations, i.e. no information regarding the upstream increase in flow stage in response to a downstream obstruction to flow is given by the HEC-1 model. The HEC-1 Users Manual states that "care should be taken in interpreting the results of the dam-break analysis. If a higher order of accuracy is needed, then an unsteady flow model should be used." The HEC-1 Users Manual also states that "the model results are in terms of discharge and not stage, although stages can be printed out by the program based on a user specified rating curve. A hydraulic computer program (HEC-2 for example) is generally used in conjunction with HEC-1 to obtain stages."

Since the HEC-1 model was used to predict flood stages at downstream stations in the DNRC dam failure study, it provided the only reasonable method with which to compare the potential effects of the Tongue River Railroad on peak flood stages. While the results of the modified Puls flood routing method employed by HEC-1 are not precise calculations of flood stage (each cross section is limited to eight data points, and backwater effects of a channel obstruction cannot be considered in the HEC-1 model), it is the only information available with which to predict the effects of the railroad on peak flood stages and compare these effects to the DNRC study.

Table 4-29 presents the computed maximum flood stage at each of the 57 cross sections in the Tongue River valley as computed by the HEC-1 computer program representing conditions with and without the rail line. The final column in Table 4-29 shows the change in water surface elevation that could theoretically be caused by the rail line under the assumed mode of failure for Tongue River Dam. The presence of the railroad would cause significant increases in the maximum flood stage at six locations, all corresponding to proposed bridges. These increases in flood stage range from 11 to 23 feet.

Considering that the contour intervals of the maps in Appendix B are 20 feet, it would be difficult to plot the difference in inundated areas due to these small changes in stage. As Table 4-29 shows, the railroad crossings have little effect on the time required for the dam failure flood wave to progress downstream.

Figure 4-2 illustrates the anticipated changes in river stage caused by the railroad bridges under the specified dam failure mode. The proposed bridges could essentially act like dams, increasing the maximum flood stage elevation for some distance upstream. However, without a more detailed computer flood routing evaluation, such as the U.S. Corps of Engineers HEC-2 model, the extent of the stage increase and the distance upstream where this effect would occur can only be estimated.

Table 4-29. Maximum Flood Stage at HEC-1 Cross Section With and Without Tongue River Railroad.

LOCATION (No. in parentheses refers to notes at end of table)	RESULTS OF HEC-1 WITHOUT RAILROAD		RESULTS OF HEC-1 WITH RAILROAD		WATER SURFACE ELEVATION CHANGE CAUSED BY RAILROAD (ft)
	MAXIMUM STAGE (ft msl)	TIME OF MAX. STAGE (hr)	MAXIMUM STAGE (ft msl)	TIME OF MAX. STAGE (hr)	
RES					
DAM	3430.0	52.7	3430.0	52.7	0.0
TRD-1	3396.3	54.0	3396.3	54.0	0.0
TRD-1A	3397.2	54.0	3397.2	54.0	0.0
SG-1	3368.5	54.5	3368.5	54.5	0.0
TR-R1 (1)	3356.4	54.5	3372.8	54.5	16.3
TR-R2 (1)	3344.3	54.5	3357.5	54.5	13.2
SG-1A (2)					
SG-1AR (1)	3340.5	54.5	3363.1	54.5	22.7
TR-R3 (1)	3328.7	55.0	3344.2	55.0	15.4
SG-2	3308.0	55.0	3307.3	55.0	-0.7
TR-R4 (1)	3302.6	55.0	3321.6	55.0	18.9
SG-2A	3285.4	55.0	3284.7	55.0	-0.7
SG-3	3269.7	55.0	3269.4	55.0	-0.3
SG-3A	3237.9	55.5	3237.5	55.5	-0.4
B-1	3227.9	55.5	3227.8	55.5	-0.2
B-1A	3202.7	55.5	3203.0	55.5	0.3
B-2	3185.9	56.0	3186.0	55.5	0.1
B-2A	3168.2	56.0	3168.0	56.0	-0.2
B-3	3154.9	56.0	3155.1	56.0	0.2
B-3A	3143.7	56.5	3143.4	56.5	-0.3
B-4	3148.0	56.5	3147.7	56.5	-0.3
BDS-1A	3100.9	57.0	3101.0	57.0	0.1
BDS-2A	3085.0	57.0	3085.4	57.0	0.4
BDS-1	3086.6	57.5	3087.0	57.0	0.4
BDS-3A	3059.5	57.5	3059.7	57.5	0.2
BDS-4A	3045.9	58.0	3046.1	57.5	0.2
BDS-2	3038.2	58.0	3038.2	58.0	0.1
TR-1 (3)	2986.8	58.5	2987.0	58.5	0.1
A-1	2984.7	58.5	2984.9	58.5	0.3
TR-2 (3)	2976.3	59.0	2976.1	59.0	-0.2
A-1A	2958.4	59.0	2958.5	59.0	0.1
TR-3 (3)	2959.0	59.0	2962.9	59.0	3.8
A-2A	2947.1	59.5	2947.1	59.5	0.1
A-2	2935.3	59.5	2935.4	59.5	0.1

Table 4-29. Maximum Flood Stage at HEC-1 Cross Section With and Without Tongue River Railroad (continued).

LOCATION (No. in parentheses refers to notes at end of table)	RESULTS OF HEC-1 WITHOUT RAILROAD		RESULTS OF HEC-1 WITH RAILROAD		WATER SURFACE ELEVATION CHANGE CAUSED BY RAILROAD (ft)
	MAXIMUM STAGE (ft msl)	TIME OF MAX. STAGE (hr)	MAXIMUM STAGE (ft msl)	TIME OF MAX. STAGE (hr)	
ASHB	2940.0	59.5	2940.2	59.5	0.3
A-3A	2916.1	60.0	2916.1	59.5	0.0
A-3	2919.4	60.0	2919.4	60.0	0.1
ANE-1A	2906.6	60.5	2907.0	60.0	0.4
ANE-1	2909.2	60.5	2909.2	60.0	0.0
TR-4 (3)	2896.8	60.5	2898.0	60.5	1.2
ANE-2A	2892.9	60.5	2893.3	60.5	0.4
TR-5 (3)	2867.3	61.0	2868.8	61.0	1.4
ANE-3A	2857.6	61.5	2857.7	61.5	0.1
TR-BR (3)	2860.0	61.5	2871.2	61.5	11.2
ANE-2	2853.8	61.5	2854.2	61.5	0.4
HD-1A	2826.3	62.0	2826.6	62.0	0.3
HD-1	2827.0	62.5	2827.3	62.0	0.3
HD-2A	2813.5	62.5	2813.6	62.5	0.1
HD-2	2805.6	62.5	2805.7	62.5	0.1
BR-1	2795.2	63.0	2795.3	63.0	0.2
BR-1A	2770.8	63.0	2771.0	63.0	0.2
BR-2A	2756.5	63.5	2756.8	63.5	0.2
B-2	2743.0	64.0	2743.1	64.0	0.1
BNW-1A	2721.7	64.5	2721.8	64.0	0.1
BNW-1	2708.4	64.5	2708.5	64.5	0.2
BNW-2A	2697.6	65.0	2697.8	64.5	0.2
HSS-1A	2669.4	65.5	2669.5	65.5	0.1
HSS-1	2654.2	66.0	2654.3	65.5	0.1
HSS-2A	2645.8	66.5	2645.9	66.0	0.1

NOTES:

1. Station added to evaluate effects of TR Proposed Extension
2. Station deleted and replaced with following station to permit evaluation of river crossing.
3. Station added in previous investigation to evaluate effects of Tongue River Railroad as originally proposed.
4. Cross Section locations are shown on maps in Appendix A.
5. Computed water surface elevations are from HEC-1 analysis assuming dam failure as follows:
   - Peak inflow = 118,000 cfs, or about 31% of revised PMF.
   - Dam fails when water level is 5 ft above spillway crest elevation.
   - Reservoir is full to top of spillway when storm runoff begins.
   - Dam breach mode is same as used by Harlan, Miller & Tait in DNRC study.

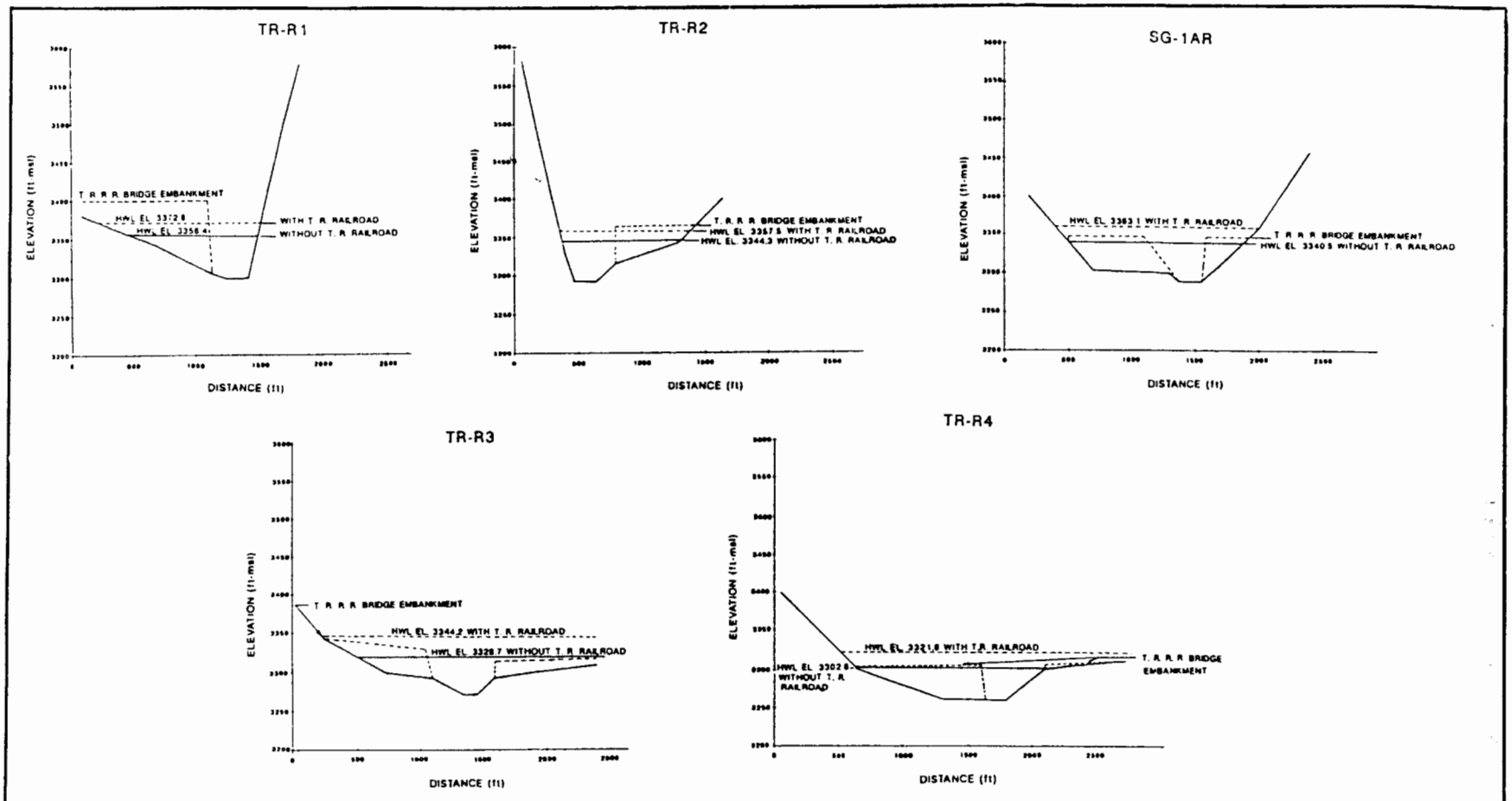

FIGURE 4-2 HEC-1 CROSS SECTIONS SHOWING EFFECTS ON DAM BREAK WATER LEVELS OF TRRC'S PREFERRED ALIGNMENT (LOCATIONS OF CROSS SECTIONS SHOWN IN APPENDIX B)

Western Water Consultants, Inc.

Figure 4-2. HEC-1 Cross sections showing effects on dam break water levels of TRRC's Preferred Alignment.

Figure 4-2 also shows the channel cross sections at the bridge locations with and without the railroad. The depths of flow as calculated by the HEC-1 analyses are shown. Overtopping of three of these embankments (TR-R3, TR-R4 and SG-1AR) would occur, as indicated by the HEC-1 evaluation. Rigorous computer analyses for this situation should therefore simulate not only the Tongue River Dam breach but also the overtopping and failure of the railroad bridge embankments. With the occurrence of the railroad bridge failures, the backwater effects caused by the bridge embankments would be somewhat mitigated.

A restriction of flow due to the railroad bridges would cause a backwater effect that could increase the peak stage elevation for some distance upstream. For the most downstream bridge (station TR-BR), this effect could possibly extend to the Town of Ashland. Ashland is approximately 10 miles upstream of the most downstream railroad bridge location, and the increase in stage at Ashland that could result from the bridge at cross section TR-BR should be significantly less than the 11 feet that was computed at the bridge location. The DNRC investigation indicated that flooding in the Ashland area due to dam failure would be extensive without the railroad. The area in the vicinity of the landing field and the St. Labre Mission would be completely inundated. The Town of Ashland in the vicinity of Montana State Highway 212 would be partially inundated without the railroad as shown in the DNRC dam failure study. This inundation may be increased somewhat if backwater effects result from the railroad bridge. For the purposes of this report, it can only be stated that the increase in flood stage at the Town of Ashland in the event of a sudden failure of the Tongue River Dam would be substantially less than the 11-foot increase that would occur at the proposed railroad bridge 10 miles below Ashland. In the area affected by the TRRC Extension, the river valley is confined by steep valley walls, and the inundation area under dam failure conditions would be affected only slightly, even with a stage increase on the order of 10 to 20 feet. For the Four Mile Creek Alternative , the upper four crossings would not be built, and the effect would be similar to those computed for Section TR-R4 (see Map 2, Appendix B, and Table 4-29).

The HEC-1 dam break simulation model used for this investigation indicates that the proposed rail line would cause only slight increases in flood stage in most of the Tongue River valley reaches containing the proposed railroad. The railroad bridges could cause significant increases in flood stage. However, these increases in flood stage are not associated with a significant increase in the floodplain width (ie., inundated area).

The railroad bridges could act like dams, thereby creating backwater effects in certain reaches of the Tongue River valley. These backwater effects could extend for some distance upriver from each bridge. However, without more rigorous computer modeling, the distance upstream that these backwater effects would extend cannot be quantified. The increase in flood stage at the Town of Ashland would be significantly less than 11 feet.

If overtopping of the railroad bridges were to result from the Tongue River Dam failure, failure of the bridge embankments would almost certainly occur. This series of "check dams" could help to attenuate the flood wave before it reaches such populated areas as the town of Ashland.

The railroad bridges are designed to pass the 100-year flood event. Assuming that such an event did not cause failure of the Tongue River Dam, the effect of the railroad bridge on flood stage and inundated areas would be expected to be less than the effects illustrated for the dam break scenario in Table 4-29.

4.6.2.3 Impacts Related to Dam Improvements

As described above, plans are being made to repair the Tongue River Dam spillway and raise the water level by four feet. Such measures should reduce the probability of failure of the dam due to spillway failure, which should also reduce the potential threat to life (see Table 4-28). Under any scenario, however, the foregoing studies indicaste that the proposed railroad will have little effect on flood levels or inundated areas.

Regarding the potential impacts of dam improvements on the railroad, there should not be any adverse affects on the proposed TRRC alignment with the raising of the reservoir. This should hold true whether the elevation of the spillway is raised 4 feet or as much as 10 feet. The present spillway elevation is 3,424 feet above sea level. The proposed subgrade of the TRRC alignment as it passes over Leaf Rock Creek to the west of the dam is 3,517 feet above sea level, a 93-foot elevation differential. The reconstruction of the spillway and dam would actually benefit the TRRC alignment since reconstruction would lessen the risk of damage to the alignment if the dam failed due to its present deficiencies.

4.7 SOILS AND GEOLOGY

Soil impacts from construction of the proposed Extension, typical of any operation where soil is removed or disturbed, stored, and replaced, may include 1) losses of suitable salvage materials through erosion and handling, 2) decreases in favorable physical properties, 3) reduction of biological activity, 4) disturbance of saline-sodic soils, and 5) slumping. The discussions below highlight these impacts with respect to specific conditions along TRRC's preferred alignment and Four Mile Creek Alternative. Figure 4-3 shows locations of sensitive soils.

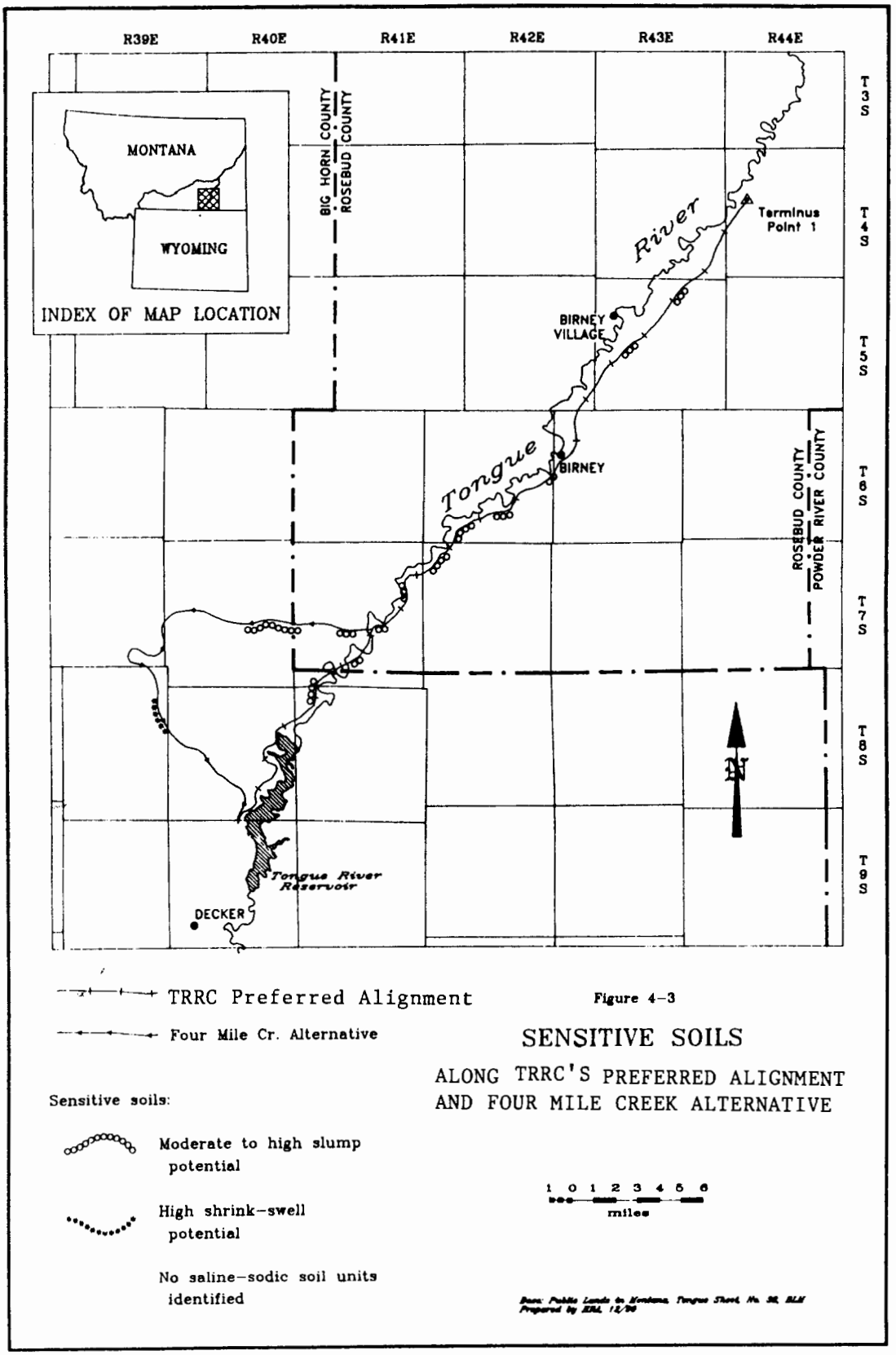

Figure 4-3. Sensitive soils along TRRC's Preferred Alignment and the Four Mile Creek Alternative.

4.7.1 Construction

4.7.1.1 Soil Loss

Some increase in soil erosion due to wind and water runoff would likely to occur during construction of the proposed Extension. Initial erosion rates are expected to be moderate to high due to soil characteristics, slope steepness, and precipitation regime. Areas cleared of topsoil, denuded or otherwise disturbed are generally more susceptible to erosive forces because subsoils tend to have lower inherent infiltration and percolation rates which increase the potential for runoff. This would be aggravated by compaction from equipment operation.

Construction areas such as temporary staging camps, construction sites, switching facility sites, and the access corridor would be susceptible to erosion. Topsoil stockpiles would also be susceptible to erosion, depending on sideslope steepness. If left exposed and unprotected for more than a couple of months, significant amounts of soil could erode.

The majority of surface soils in the ROW have fine fractions (<2mm) with loamy to silty clay loam textures, which have a moderate to low susceptibility to wind and water erosion. However, slope steepness plays an important role in the potential for erosion due to runoff. Where slopes exceed 15%, erosion potential would be high regardless of the fine-fraction texture. Conversely, erosion potential would be reduced where coarse fragment content exceeds 50 percent.

Based on the Universal Soil Loss Equation (USLE), an estimated 54,200 tons of soil per year may be lost for TRRC's preferred alignment. Greater earthwork during construction of the Four Mile Creek Alternative could result in the loss of 63,100 tons of soil per year. Potential soil erosion is estimated to be of low significance over the length of the ROW during construction. However, several locations are of concern because of their proximity to the Tongue River, which increases the potential for sedimentation. These locations are on very steep slopes with little floodplain or riparian area to buffer potential sediment delivery. Estimates of the expected sedimentation in the Tongue River are presented in Section 4.8, "Hydrology and Water Quality."

The use of appropriate construction practices offers a way to mitigate construction impacts. These practices include minimizing soil disturbance and displacement and leaving as little soil as possible unprotected at a given time. Standard reclamation techniques -- such as mulching, roughening the soil, soil moistening, and vegetative cover also would help to reduced amounts of soil loss from wind and water erosion.

Prompt implementation of erosion control measures is critical to minimizing erosion potential. Immediate seeding, mulching or other interim soil stabilization techniques, especially on the ROW and access road cut-and-fills should be considered until interim

seeding or final reclamation is implemented. This is particularly critical for areas adjacent to the Tongue River or the several perennial tributaries along the route.

Mulching or seeding could be applied to stockpiles that would not be slated for interim seed mixes until they reach design capacity, even if these areas were to be covered by additional salvaged topsoil.

4.7.1.2 Physical Characteristics

The physical properties of soil in reclaimed areas could be very different from conditions before disturbance. Handling could result in the loss of the natural soil profile, destruction of pore space continuity and soil structure, and a loss of organic matter due to mixing and dilution. These changes would adversely affect soil-plant relations due to decreased soil water holding capacity and aeration. A moderate amount of coarse fragment present in project area soils could help to offset these impacts.

The annual precipitation in the project area is relatively low. Consequently, soil moisture stress would probably be limited in most years. This factor would contribute to potential adverse impacts to soil water-plant relations.

The incorporation of organic matter such as peat or aged-manure into respread soils or nutrient deficient subsoil/substratum material before planting and mulching would enhance the chances of vegetation establishment. This would also would accelerate the soil rebuilding processes.

4.7.1.3 Soil Biological Activity

Biological impacts would occur in most salvaged or disturbed soils. Disturbance and storage can decrease important soil microorganisms such as bacteria, fungi, and algae which are essential in soil nutrient cycling (Miller and Cameron 1976). In addition, some favorable components normally found in natural soils are lost through decomposition during storage. These components include seeds of native plants, rhizomes (underground stems), and other plant parts capable of producing new plants. Replenishment of these organisms is limited to the surface (6 to 8 inches) of the stockpile assuming some vegetation becomes established. The remainder of stockpiled soil becomes sterile. These impacts, for the most part, would be unavoidable but they would be short-term and are therefore considered to be of relatively little significance.

4.7.1.4 Saline and Sodic Soils

Most soils in the project area have low to moderate alkalinity levels and low sodium levels. However, no saline or sodic soils have been identified for TRRC's preferred alignment or the Four Mile Creek Alternative. The original 89-mile TRRC alignment

passes through some saline, sodic, and saline-sodic soils, however, these soils do not occur in the upper Tongue River to any large extent. Localized areas could be identified during construction phase staking.

4.7.1.5 Slumping

Shallow soils over weathered shale bedrock on slopes greater than 25% would have a high potential for failure, or slumping, especially when wet. Soil slumping can undermine the stability of the track and ROW if they are not properly constructed where slumping could occur. Approximately 3.2 miles of TRRC's preferred alignment passes through these types of areas. The Four Mile Creek Alternative would pass through about 4.5 miles of area with moderate to high potential for slumping (2.4 miles of this occurs in the lower Four-Mile Creek drainage). The exact nature of the soils, and the determination that it would actually slump, could only be ascertained from detailed, on-site geologic and engineering tests. These tests would be conducted during the final engineering program if the proposed Extension is approved. As with erosion potential, slumping potential is of the highest concern where alignments cross sensitive soils and are adjacent to the Tongue River.

4.7.2 Operation and Maintenance

The impacts to soils from the operation and maintenance of the proposed railroad would be similar to construction impacts but of considerably less extent and significance. Until vegetation became established along either TRRC's preferred alignment or the Four Mile Creek Alternative, potential water and wind erosion would have the greatest potential impact. Impacts could also be associated with toxic substances from fuel spills or vegetation control measures used to prevent noxious weed invasion or to decrease fire potential. All of these impacts could potentially reduce the vigor of desirable native or reclamation species or adversely affect the chemical/nutrient balance of the soil.

Since potential soil loss due to erosion and slumping would be the principal impact associated with long-term operation and maintenance of the rail line, establishment of a healthy vegetation cover would be critical to minimizing long-term adverse impacts.

4.8 HYDROLOGY AND WATER QUALITY

4.8.1 Construction

4.8.1.1 Identification and Treatment of Wetlands

The 1985 TRRC EIS has been updated by inclusion of a preliminary wetlands finding for the original 89-Mile alignment. This preliminary assessment is in conformance with recent guidance from the U.S. Army Corps of Engineers (COE), the Environmental Protection Agency (EPA), and the U.S. Fish & Wildlife Service (FWS). Table 4-30 summarizes the preliminary wetlands finding for the original alignment. The results are based on a review of topographic maps and aerial photography. The amount of actual disturbed acres at each location is undetermined but would likely be fairly small. TRRC proposes to conduct a more detailed wetlands review during final engineering. Specific acreages would then be determined.

A preliminary wetlands finding also was prepared for TRRC's preferred alignment and the Four Mile Creek Alternative. A reconnaissance level survey was conducted in March 1990 to identify wetland areas and to inspect proposed stream crossing and areas of possible encroachment. This reconnaissance level survey was conducted in accordance with Executive Order 11990 and Section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344). This survey was conducted to identify possible avoidance areas early in the planning process. TRRC plans to conduct more detailed wetland studies as necessary during final engineering. Seven possible wetland locations on TRRC's preferred alignment were identified during the reconnaissance level survey. There would be three possible wetland locations affected on the Four Mile Creek Alternative. Figure 4-4 shows the location of these sites. Table 4-31 presents impact data for each location.

According to the current federal administrative policy of "no net loss" of wetlands, any wetlands that would be drained or filled by railroad construction would require replacement somewhere within the same general vicinity. For highway construction projects, wetlands mitigation typically takes the form of construction or enlargement of reservoirs, creating a water surface area at least equal to that destroyed by the construction project. TRRC would cross numerous small drainages, creating several opportunities for wetlands mitigation assuming that cooperating landowners can be located in the same hydrologic region. Where the railroad would cross the Tongue River, acquisition of additional ROW within the floodplain could provide the opportunity to design and construct waterfowl habitat features such as perennial pools with islands and irregular, vegetated shorelines as an integral part of the railroad construction. Wetland mitigation would require a Section 404 permit from the COE.

Table 4-30. Preliminary Wetlands Finding. Potential Wetland Areas for Original 89-Mile Line: Proposed Action.

Site	Location	Legal			Wetland[1] Potential	Air Photo Reference		
		Section	Township	Range		Roll	Frame	Scale
1	Spotted Eagle Lake and Fish Hatchery	4	7N	47E	1	3051	20	1:12000
2	Unnamed intermittent tributary (UIT) & Tongue R. (TR)	6	6N	48E	2	3051	34	1:12000
3	UIT crossing/TR encroachment	18	6N	48E	2	3051	66	1:12000
4	UIT crossing/TR encroachment	19	6N	48E	3	3051	66	1:12000
5	TR encroachment	31	6N	48E	3	3053	12	1:12000
6	TR encroachment	31	6N	48E	3	3053	131	1:12000
7	TR encroachment	13	5N	47E	3	3052	126	1:12000
8	Circle L Cr./TR	13,14	5N	47E	2	3052	124	1:12000
9	TR encroachment	23	5N	47E	3	3052	122	1:12000
10	TR encroachment	27,34	5N	47E	3	3052	120	1:12000
11	Yank Cr. crossing	20	4N	47E	1	3051	158	1:12000
12	Mile Cr. crossing	19	4N	47E	2	3051	157	1:12000
13	Cottonwood Cr. crossing, stockpond	19	2N	45E	3	3052	66	1:12000
14	TR crossing near Lay Cr.[2]	27	1S	44E	1	3051	182	1:12000
15	UIT crossing/TR encroachment	34	1S	44E	1	3051	180	1:12000
16	TR encroachment	3	2S	44E	3	3051	178	1:12000
17	TR encroachment	10	2S	44E	3	3054	14	1:24000
18	TR encroachment	15	2S	44E	3	3054	15	1:24000
19	TR encroachment	27	2S	44E	3	3054	15	1:24000
20	Cook Cr. crossing & TR encroachment	27	2S	44E	2	3054	15	1:24000
21	Double E Coulee crossing & TR encroachment	35	2S	44E	2	3054	16	1:24000
22	Otter Cr. crossing at Ashland[2]	2,11	3S	44E	1	3054	17	1:24000
23	TR encroachment	15	3S	44E	1	3054	54	1:24000
24	Spring Cr. crossing and TR encroachment[2]	27	3S	44E	1	3054	54	1:24000
25	Bridge Cr. crossing	27	3S	44E	3	3054	54	1:24000

[1] Potential for finding a jurisdictional wetland area based on topographic features and air photo interpretation 1 = high, 2 = moderate, 3 = low.
[2] Areas submitted for 404 permit application May, 1985 and given preliminary approval August, 1986.

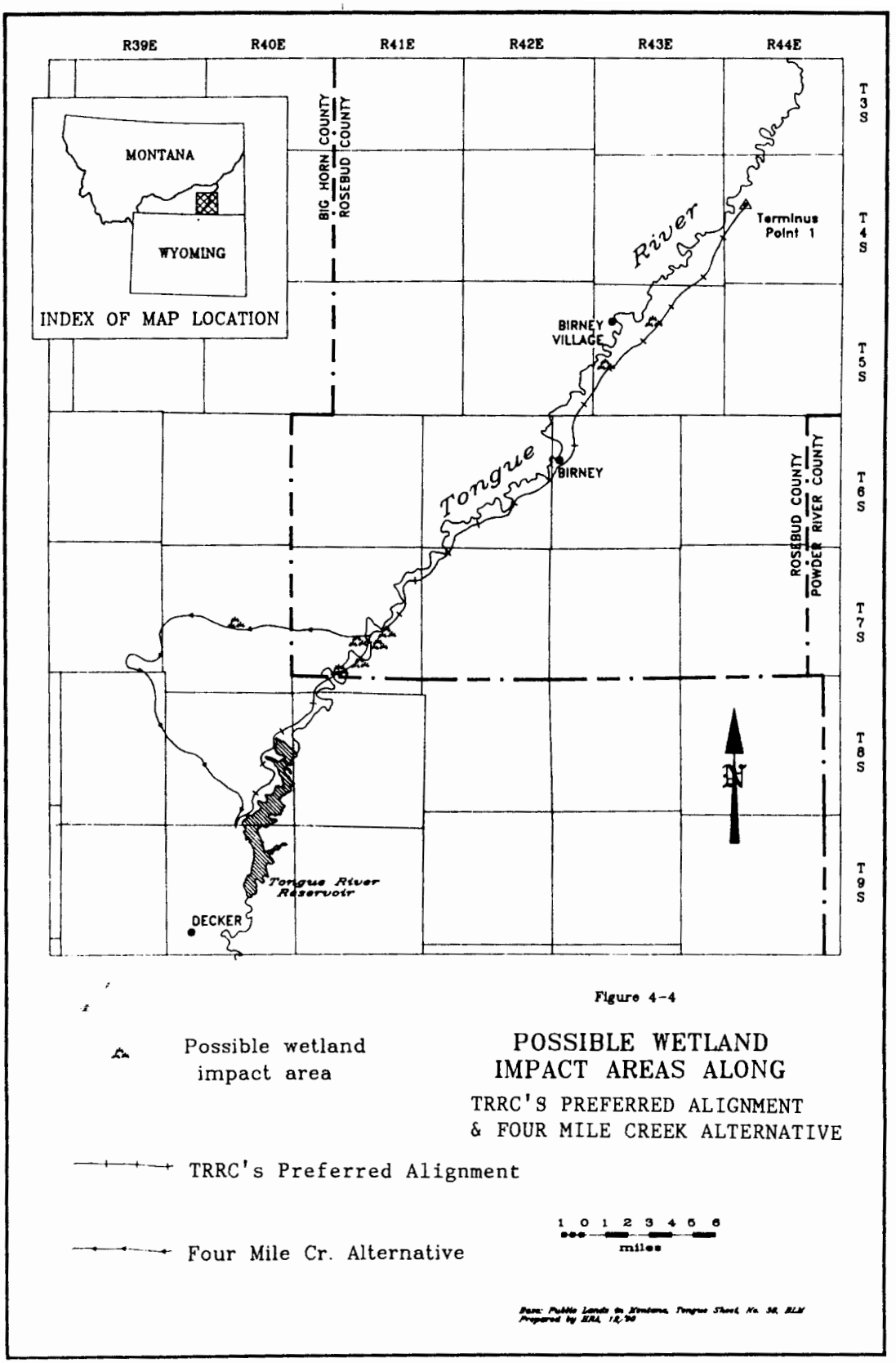

Figure 4-4. Possible wetland impact areas along TRRC's Preferred Alignment and the Four Mile Creek Alternative.

Table 4-31. Possible Wetland Impact Areas.

LOCATION	CHARACTERISTICS
TRRC'S PREFERRED ALIGNMENT	
Tongue River: Crossing #1 NW/4 S27, T7S R41E	A very narrow riparian area in marginal condition occurs on both banks. The area may not meet jurisdictional wetland definitions.
Tongue River: Crossing #2 NW/4 S34 T7S R41E	A narrow strip of riparian graminoid community type would likely qualify as wetland. The area has a very low functional value.
Tongue River: Crossing #3 SW/4 S33 T7S R41E	A narrow strip of good riparian graminoid community type. The area has a low functional value.
Harris Creek Crossing	A small wetland of moderate significance. The area is apparently spring-fed and provides good cover and habitat diversity.
Stock Pond S19 T5S R43E	Very low wetland value.
Stock Pond S9 T5S R43E	Low wetland value.
Hanging Woman Creek	Generally a perennial stream, although in the last couple of years flow has been extremely low or non-existent after spring runoff. A jurisdictional wetland of low to moderate value probably occurs at this crossing.
FOUR MILE CREEK ALTERNATIVE	
Tongue River Crossing NW/R S27 T7S R41E	Four Mile Creek is intermittent but the mouth creates a backwater of the Tongue River and creates a small wetland of low functional value. The habitat has fair diversity with cattail, shrub and tree components but weedy species (burdock, in particular) have taken a strong hold.
Barber Draw NE/4SW/4 S15 T7S R40E	A spring which is heavily used by livestock and wildlife would probably meet jurisdictional wetland definition.
Hanging Woman Creek	Generally a perennial stream, although in the last couple of years flow has been extremely low or non-existent after spring runoff. A jurisdictional wetland of low to moderate value probably occurs at this crossing.

4.8.1.2 Section 404 Permits/Section 310 Permits

TRRC's preferred alignment or the Four Mile Creek Alternative would cross a number of perennial and ephemeral streams (Table 4-32). Some of these crossings would require Section 404 Permits from the COE. With the preferred alignment, a crossing at Hanging Woman Creek and the five bridges over the Tongue River, each of which would require excavation and/or fill within the stream's normal high water line, would require permits. With the Four Mile Creek Alternative, only the Hanging Woman Creek Bridge and the one Tongue River crossing would likely require 404 permits.

Table 4-32. Stream/ River Crossings for TRRC's Preferred Alignment and Four Mile Creek Alternative.

IMPACT CATEGORY	TRRC PREFERRED ALIGNMENT	FOUR MILE CREEK ALTERNATIVE
Number of ephemeral or intermittent stream crossings	98	43
Number of perennial stream crossings	1	1
Number of river crossings	5	1

In addition to the crossings, five additional sites have been identified where impacts to the Tongue River or its tributaries might require Section 404 permits. These sites are possible encroachment areas where the alignment could infringe on the banks of the Tongue River or possibly deliver sediment directly to the Tongue River. The number of possible encroachments would be reduced to four under the Four Mile Creek Alternative.

TRRC has contacted the COE concerning the need for 404 permits. If the Commission approves TRRC's proposed Extension, TRRC plans to submit any needed Section 404 permit applications to the COE. In conjunction with the COE's review of the need for 404 permits, the COE would also rely on the information presented in this EIS.

Pursuant to the Montana state law entitled the Streambed and Land Preservation Act of 1975, TRRC would also be required to obtain state 310 permits and temporary turbidity permits issued by the Big Horn and Rosebud County Conservation Districts.

4.8.1.3 Increase in Sediment Loads and Suspended Solids

The Universal Soil Loss Equation (USLE) and an appropriate sediment delivery ratio were used to estimate erosion from railroad construction and the effect that such erosion might have on water quality in the Tongue River. Results of the erosion estimates are summarized in Table 4-33.

The gross erosion rate for the Four Mile Creek Alternative would only slightly smaller than that for TRRC's preferred alignment. However, total erosion would be larger for the Four Mile Creek Alternative because of its greater length and, hence, greater disturbed area. As described in the 1985 TRRC EIS, all actions and alternatives were compared assuming the soil erodability factor, or K factor, was the same for all soils. To facilitate comparison, the same assumption was used for the analysis of the proposed Extension. However, it is believed that this assumption is very conservative in this case, since the deeper cuts for TRRC's preferred alignment would probably be made into bedrock. For a balanced project, the adjacent fills would be constructed of rock from these

deep cuts. The cut slopes into bedrock and the fill slopes constructed of rock would be much less erosive than corresponding slopes in soil. Therefore, the erosion rates shown in Table 4-33 should be viewed as worst-case estimates.

Table 4-33. Estimated Gross Erosion for TRRC's Preferred Alignment and Four Mile Creek Alternative During the Construction Period.

ACTION	Affected Area[1] (acres)	Slope Length[2] (feet)	LS Factor[3]	Gross Erosion (T/ac/yr)	Gross Erosion (T/yr)
TRRC's Preferred Alignment	660	66.61	10.27	82.2	54,200
Four Mile Alternative	783	64.53	10.08	80.6	63,100

[1] The affected area was obtained from plan-profile sheets. Area is adjusted to eliminate the level top of the roadway which was not included in soil loss calculations.

[2] Average slope length was computed for each action using plan-profile sheets and assuming average cut and fill slopes of 2H:IV.

[3] LS factors for USLE were computed from the formula $LS = \left(\frac{slope\ length}{75}\right)^{0.6}\left(\frac{slope}{9}\right)^{1.4}$ (Wischmeier and Smith, 1978). Other USLE factors: R=25; K=0.32; C=1.0; P=1.0.

Not all of the soil material which erodes from the construction slopes would find its way into a stream. Slopes are abruptly reduced at the toes of cuts and fills, causing much of the eroded material to be deposited very near the source. The estimated sediment delivery ratio (ratio of sediment delivered to any point in the stream to the total erosion above that point) for Montana's Tongue River Basin is 6 percent. For this analysis, it was assumed that the sediment delivery ratio is 8 percent. Table 4-34 shows the total increase in total suspended solids (TSS) for the entire project. The preferred alignment could increase the incremental sediment load to the Tongue River caused by railroad construction by 74 percent to 125 percent. For the Four Mile Creek Alternative these incremental increases of sediment load are slightly larger, ranging from 86 percent to 154 percent.

The eroded material, over a short term, could increase the average TSS concentration of the Tongue River by roughly 10 to 12 mg/l. The resulting increase in average TSS concentration in the Tongue River for the entire alignment would be between 22 and 23 ml/l for either the preferred alignment or the Four Mile Creek Alternative. Current TSS concentrations in the Tongue River at Miles City typically range from 5 mg/l in October and November to 1,200 mg/l during May and June. It is during the higher-flow periods that sediment eroded from the proposed rail line could wash into area streams. This would occur at times when TSS concentrations in area streams are at their higher levels. Therefore, the impact of railroad construction on suspended-solids concentrations would be small and well within the current fluctuations of TSS concentration.

Table 4-34. Average Short-Term Increase in Total Suspended Solids (TSS) for the Tongue River, Otter Creek and Rosebud Creek for Proposed Action, Options and Alternatives with Proposed Extension.

Action	Increase in Sediment Load to Stream[1] (T/yr)	Increase in TSS[2]		
		Tongue River (mg/l)	Otter Creek (mg/l)	Rosebud Creek (mg/l)
TRRC Permitted Rail Line	5400	12	19	0
With TRRC's Preferred Alignment	9700	22	19	0
Four Mile Alternative	10400	23	19	0

[1] Gross erosion from Table 1 times 8 percent (delivery ratio).
[2] Assumes mean annual flows of 328,900 acre-feet (AF) for Tongue River at Miles City; 19,000 AF for Otter Creek at Ashland.

Some temporary increase in TSS would occur during bridge construction. Where piers, bridge abutments, retaining walls, riprap, etc. are needed within the defined river channel, TRRC plans to install a cofferdam around and immediately below the area which is going to be disturbed. These "cofferdams" would be constructed from sand bags and/or other materials that would allow the flow of water but would inhibit sediment from leaving the construction area. TRRC also proposes to use "silt fence" or cloth to reduce the amount of TSS from entering the main flow of the river.

It would be necessary to drive rubber tired heavy equipment into the river in order to construct the cofferdams, piers, abutments, etc.

In some cases where piers, abutments, and/or foundations would be required, steel "sheet pilings" would be driven into the river bottom to form an impervious wall around the site of the foundation. The sheeting would be driven into competent soils, potentially as far as 40 to 50 feet, thus requiring heavy equipment for this phase of the work. The top of the sheets would be left above the water surface so the area in the middle can be pumped dry for the installation of the pier or foundation.

Water pumped from these areas would not be returned to the Tongue River directly. It could be necessary to build stilling basins for this water to allow sediment to settle. If sheet pilings were required, they would usually become part of the formwork when the final concrete was poured.

These measures are designed to minimize the impact of bridge construction. The bridges located at stations 1528, 1577, and 1631 would have the least input of sediment. These bridges are located on the Tongue River in relatively straight sections of river in areas where the riparian zone is relatively broad, flat, and grassy. It should be possible to construct these three bridges with less disturbance as there is sufficient room on both sides of the river for heavy equipment operation.

The bridges located at stations 1665 and 1675 would provide access to a tunnel. There is no flat ground on the tunnel side of these bridges in which to operate heavy equipment or to build bridge pilings. It would be necessary to build a benched area on the cliff side either by cutting into the sandstone walls, or by using rock riprap as fill material. The greatest impact to the river would come from the abutment construction, as it would be necessary to drive rubber tired cranes into the river in order to install the bridge spans. The only way to access to the tunnel site would be to drive across the river. One or two river crossing sites would have to be designated. Once the bridge was constructed, the tunnel would then be bored using the bridge for access. All material removed during tunnel construction would be taken back across the river on the bridge. Bridge construction at these two sites would result in temporary but significant increases in TSS downstream.

Bridge construction over Hanging Woman Creek (station 817) would temporarily increase TSS in that stream. Due to the steepness of the bank on the south side of the creek at the bridge site, TSS could increase significantly if proper precautions are not taken, such as limiting heavy equipment in the streambed and installing temporary riprap.

4.8.1.4 Changes in Surface Drainage Patterns and Aquifers

Construction of TRRC's preferred alignment or the Four Mile Creek Alternative should not significantly affect surface drainage patterns. The installation of properly sized culverts and the maintenance of those culverts by clearing debris would allow water to follow its normal course. It is possible that the construction of the railroad would cause some water to accumulate at the toes of cut and fill slopes. However, the construction of simple ditches at such points would effectively allow water to drain into the appropriate stream.

There should be no impacts to ground water aquifers from construction of the rail line. Depths from the surface to the first significant water-bearing zone are least in the stream valleys (alluvial areas, 10-25 feet), and increase at a distance from the valleys (60-90 feet). Since valley areas would require fill, as opposed to cuts, excavation in the valleys should be limited to removing topsoil and vegetation. Cut areas are generally in the hilly, nonvalley regions and should be limited to between 10 and 25 feet. The average cut depth in the extension reach is about 20 feet. Only rarely does a cut exceed 50 feet. Since the depth to ground water in nonvalley areas generally is more than 50 feet, no impact to ground water is expected to occur from the construction of the proposed rail line.

All perennial streams in the study area are local ground-water discharge points, such as springs and perennial creeks. Therefore, if for any reason an excavation were required in an alluvial area, any effects would be limited to the immediate locale. There would be no effect on ground-water quality or quantity in the shallow alluvial aquifers.

4.8.1.5 Bridge and Culvert Construction

The proposed Extension would require the placement of numerous culverts across ephemeral and intermittent streams. TRRC's preferred alignment would require five bridges over the Tongue River and one over Hanging Woman Creek. The Four Mile Creek Alternative would include the Hanging Woman Creek bridge and one bridge over the Tongue River.

Short and long term impacts to water quality can occur from the improper selection and placement of culverts across intermittent streams. Selection of a culvert with too small a diameter, placement of the culvert in a stream during periods of flow, and failure to adequately stabilize fill slopes could result in short term impacts to the water quality. TRRC states that it would select culverts ranging in diameter size from 24 inches to 120 inches, depending upon the size of streams and upon the heights of fill. The culverts would be of sufficient size to withstand a 25-year flood event and generally would be installed during times of no or minimal streamflow, thus reducing the chance of increasing TSS in the stream. Moreover, stream banks adjacent to culverts would be seeded and mulched in order to stabilize slopes as rapidly as possible and thereby to reduce soil erosion. In some cases, the use of riprap could be necessary to ensure slope stability. These measures should reduce the likelihood of serious impacts to water quality at stream crossings. However, improper placement of culverts during the construction phase of the project could create a condition whereby the sediment transport capacity of a particular reach of stream would be altered. This situation, called "nonequilibrium," could have a long term impact on water quality.

Construction of bridges across the Tongue River and Hanging Woman Creek could cause some temporary increases in TSS concentrations. Channel work during periods of high flow (spring runoff) is dangerous. Therefore, most work would have to be done during lower flow periods, when natural TSS concentrations are lower. Temporary TSS concentrations could be significant during construction of the bridges, but the impact could be mitigated partially by expediting the work.

4.8.1.6 Impacts to Flood-Prone Areas

The proposed rail line would encroach on some flood-prone areas as defined in the Yellowstone-Tongue Area-wide Planning Organization 208 study (1978) and the Custer County Unincorporated Area Flood Hazard Boundary Map (June 26, 1979). Consistent with Executive Order 11988 and the Department of Transportation Order 5650.2, these

encroachments have been reviewed for their potential impacts to human life, property, transportation and natural and beneficial flood plain values.

The only encroachments that would be considered potentially significant for the proposed Extension would be the previously noted river and stream crossings (Tongue River and Hanging Woman Creek). If they are properly designed, the river crossings should not alter the 100-year flood plain.

Encroachments on the flood plain would not cause additional threat to human life from flood waters. Disruptions to transportation on the rail line would occur only if a greater than 100-year flood event destroyed part of the track. Provision of proper flow capacity should ensure that bridges did not affect the natural moderation of flood flows. Other than short term increases in suspended sediment and turbidity, the crossings should not affect water quality or aquatic life. Bridge construction is not expected to result in adverse impacts to ground-water recharge, wildlife, open space, scientific study, outdoor recreation, agriculture, aquaculture, or forestry within the designated flood plains.

4.8.2 Operation and Maintenance

During operation and maintenance activities, diesel fuel, coal or herbicides could be spilled into streams. Fueling of locomotives is expected to be done at Glendive and not at any point along the TRRC route. A contingency plan would be developed to minimize impacts should a spill occur in the yards. Therefore, diesel fuel spills should occur only in the relatively rare instance of a derailment. Coal would be hauled on unit trains, meaning that, once loaded, it would not be rehandled within the project area. Coal spills also would occur only in the event of a derailment. Control of noxious weeds would be required along the railroad ROW. Spraying adjacent to streams would create the possibility that overspraying or wind drift could introduce the spray into a stream. There also is the possibility of a spill of this substance.

Should a derailment or a herbicide spill occur near a stream, and should diesel fuel, coal, or the herbicide make its way into the water, water quality would be temporarily impacted. Number 2 diesel fuel, being lighter than water, would coat and destroy plankton, while water soluble fractions would be toxic to aquatic life. Considering travel time in flowing streams, the effects of a floating or dissolved substance would be removed from the project area within one (1) week. However, possibly a year or more would be required for aquatic flora and fauna to regenerate. If coal were spilled directly into a stream, it would remain in place until removed by clean-up activities or transported downstream as part of the stream's sediment load during successive flood events. Chemical water quality would not be significantly affected, but the coal could interfere with activities such as fish spawning in the Tongue River if it occurred in a shallow area used as a spawning bed.

As stated earlier, TRRC would use either mechanical or chemical devices to control noxious weeds. The use of weed control chemicals would be governed by the time of year, dryness, and proximity to bodies of water or proximity to ecologically sensitive areas. Normal overspraying and wind drift should not introduce herbicides into a water body in amounts that would be toxic to aquatic biota. If a spill of herbicide substances were to occur, the toxic levels would be in the immediate vicinity of the spill, but would be quickly dispersed due to the high water solubility of 2,4-D and natural mixing in the stream. Due to the proximity of the proposed Extension to portions of the Tongue River Reservoir, precautions must be taken to avoid spills. If a spill were to occur sufficiently close to the reservoir to enter that water body, it could be significant in that it could take years for all the contaminated water to be flushed out of the reservoir. The Four Mile Creek Alternative would be further from the reservoir and therefore less likely to affect water quality in the reservoir.

The State of Montana has a Hazardous Material Response Plan. In the event of a spill of coal, fuel, or herbicide, TRRC would call a designated telephone number in Helena, Montana to initiate emergency measures under this plan.

4.9 AQUATIC ECOLOGY

4.9.1 Construction

4.9.1.1 Impact to Aquatic Organisms

The upper portion of the Tongue River (fishery zone V) contains aquatic invertebrates that are adapted to the relatively cold, clear water that is released from Tongue River Dam. This is the portion of the river that would be impacted by bridge construction under TRRC's preferred aliagnment. The temporary increases in TSS that would result from bridge construction could cause a temporary increase in downstream drift of aquatic invertebrates, and a resulting lowering of invertebrate populations in the area of the bridges. Impact to this portion of the river would not occur under the Four Mile Creek Alternative. If construction is approved and completed, and the fine sediment has been flushed from the substrate, recolonization of macroinvertebrates would be expected to occur.

4.9.1.2 Impact to Fish Populations

The impacts to fish populations from construction of the proposed Extension would occur primarily as a result of increases in TSS. The impacts of sediment on fish are well documented in the literature. Sediments have the potential to affect fish by 1) clogging and abrading gills and other respiratory surfaces, 2) adhering to the chorion of eggs, 3) providing conditions conducive to the entry and persistence of disease related organisms, 4)

inducing behavioral change, 5) entombing different life stages, 6) altering water chemistry by the adsorption of chemicals, 7) affecting utilizable habitat by scouring and filling of pools and riffles and changing bedload composition, 8) reducing photosynthesis and primary production, 9) affecting intragravel permeability and dissolved oxygen levels which effect egg and embryo stages of salmonids which develop within the gravel, and, 10) affecting the fishing for and the catchability of sport fishes.

Hanging Woman Creek is a known spawning area for smallmouth bass and northern pike. If construction were to take place at a spawning site during or immediately after spawning season and precautions were not taken, there could be significant impacts to the eggs and fry of these species. These potential impacts would occur at this location regardless of which route were selected. It is unknown what percentage of the total recruitment comes from this spawning area. Smallmouth bass spawning is widely dispersed throughout the river and the loss of one spawning area for one season may or may not have an impact on the total smallmouth populations in the river. Northern pike spawning habitat appears to be more scarce in the Tongue River and impacts to these fish may be more significant.

It is not known if any other spawning areas are located in or downstream from the other bridge crossings. However, the increases in sediment loads which could occur during the construction of the bridges may be significant enough to cause fish to migrate out of that section of river temporarily. Construction could also temporarily deter fish movement through the construction zone. Sensitive fish species could suffer from gill irritation due to increases in sediment loads during the construction period.

Under the Four Mile Creek Alternative, impacts would occur at only two bridge crossings.

4.9.1.3 Mitigative Measures for Sedimentation Impacts

With TRRC's preferred alignment, the construction of the bridges located at stations 1665 and 1675 would have the greatest potential to impact Tongue River fish populations because of the lack of access and the steepness of the slopes on the east side (tunnel side) of the river. The proposed bridge crossing site at Hanging Woman Creek is in a known fish spawning area. This bridge site also has a steep bank on one side, increasing the probability of sediment entering the stream. All of the other proposed bridge crossings on the Tongue River would result in temporary increase of TSS.

If construction occurs near spawning areas in Hanging Woman Creek, impacts could be minimized by scheduling construction at this location from April to June. The possibility of other spawning locations existing in or downstream from bridge crossing zones could be evaluated using site-specific sampling prior to the final alignment of the railroad. If other spawning areas were found at the other bridge crossings, similar mitigation measures could

be required.

In addition, impacts could be minimized by taking reasonable precautions to reduce sediment entering streams. Possible precautions include: 1) disposal of all construction debris on land to prevent its entry into a waterway or wetland, 2) careful operation of equipment for handling and conveying materials to prevent dumping or spilling materials into the water, 3) placement of all dredged or excavated materials (except for that required for cofferdams, abutments, piers, foundations, etc.) on an upland site above the ordinary high water line to prevent their return to the waterway 4) careful handling of petroleum products to prevent their entry into the water 5) limited clearing of vegetation and 6) reseeding with indigenous vegetation of disturbed areas.

4.9.1.4 Impact of Fuel and Chemical Spills From Heavy Equipment

There are a variety of effects of petroleum products that have been documented to occur in natural waters after oil spills. These include: 1) acute toxicity to aquatic life, 2) chronic toxicity to aquatic life, and 3) bioaccumulation of petroleum products in fish and subsequent tainting of fish flesh. The acute toxicities of diesel fuel, and common solvents found in diesel fuel, to freshwater fishes are relatively low. Oil spills in open waters often do not result in acute fish kills. However, some toxicity of small fishes or invertebrates may occur in shallow, near shore areas where oils are in close contact with the bottom. Additionally, small fish are more sensitive to oil and oil products than are large fish. The available data indicate that the sensitivity of fishes to oil decreases with time of exposure because the fish are able to synthesize enzymes needed to metabolize and excrete the toxic compounds.

Chronic toxicity criteria to protect freshwater aquatic life have not been developed for all the solvents present in diesel fuel. Chronic affects on fish observed after exposure to various oil products include delay in hatching, disruption of feeding behavior, deformed larvae, and an increased rate of respiration, indicating stress. However, the above effects were observed during laboratory experiments when the oil was continually present.

Tainting of edible flesh in fish is a frequently encountered problem with oil spills. Diesel oils contain many of the most odorous components of oil and hence are among the most likely to taint fish flesh. The EPA indicates that tainting from petroleum products occurs at concentrations below those levels that constitute a human health concern.

The maximum amount of fuel that is likely to spill into the Tongue River at one time during construction would be 1200 gallons. This is the amount of fuel carried by a "service truck" which fuels heavy equipment. These trucks would also carry approximately 200 gallons of oil, solvents, and other lubricants when full. A large loader or bulldozer can carry 300 gallons of fuel in its tanks when full. A mitigation measure to minimize the

adverse effects of fuel spills would be to require that all refueling of equipment occur well away from a water body.

4.9.1.5 Alteration and/or Loss of Habitat Because of Flood Plain Restrictions

The proposed bridges over the Tongue River and Hanging Woman Creek would be 400 to 500 feet in total length. The average bridge would probably have four spans no more than 120 feet long, with three sets of piers and two abutments. The location of the piers in the river would depend upon the particular geotechnical information along with the angle of the proposed alignment as compared to the flow of the channel. Each set of piers could take up as much as 50 square feet of river bottom, but the actual size of the piers would be determined by the geotechnical or soils design information.

A proper bridge design, with the provision of sufficient flow capacity, should prevent any major alteration of the flood plain and, thereby, should minimize the loss of aquatic habitat. The timing of the railroad grade construction to avoid peak discharge periods, and the stabilization of the railroad bed soon after its completion, would help to prevent impacts to the flood plain and to aquatic resources.

4.9.1.6 Review of the Resource Values of the Various Segments of the Stream for Sports Fishery, Habitat, and Species

The Tongue River is primarily a smallmouth bass fishery. This fishery is self-reproducing and is distributed throughout the length of the river. There is a backwater area near the proposed bridge for the Four Mile Creek Alternative that could be a smallmouth bass spawning and rearing area. The reach of the Tongue River between Tongue River Dam and Birney also contains rainbow trout and a few brown trout. The rainbow trout fishery is maintained with hatchery stock and little over winter survival occurs. The mouth of the Tongue River is a spawning stream for Yellowstone River shovelnose sturgeon, burbot, paddlefish, and blue sucker. Northern pike, also a popular sport fish, are also found in the river.

The quality of recreational fishing could be degraded on a localized basis during construction of the bridge crossings. Additional turbidity during construction of the TRRC could result in fish being unable to see bait or lures which are being used by anglers. In addition, fish behavior could be modified due to the disturbance of the aquatic environment. Under the Four Mile Creek Alternative, there would be fewer bridges and thus less potential for adverse impact. However, it should be noted that access to the river is dependent on available public access points, since access along the river's entire length, from the dam to the mouth, is largely controlled by private landowners.

Access to the river could be impaired in those areas where the railroad is in between the river and the Tongue River road. There are four places where this would occur in the

canyon area between Tongue River Dam and Birney. These areas, however, are all controlled by private landowners. The longest of these areas is between stations 1528 and 1577, a distance of just under 1 mile. The shortest reach where access may be blocked is between stations 1720 and 1740, a distance of about 2000 feet. These specific areas could be easily avoided by anglers wishing to gain access to the Tongue River. If the Four Mile Creek Alternative is adopted, there could be an access restriction to fishing near the bridge at Four Mile Creek.

4.9.2 Operation and Maintenance

4.9.2.1 Impact in the Event of Fuel and Chemical Spills

The potential impacts of diesel fuel on the aquatic environment are described in section 4.9.1.4. The impact of a fuel or chemical spill on the aquatic environment would depend on the type and quantity of chemical spilled, the flow in the Tongue River at the time of the spill, aquatic resources present in the river in the area of the spill, and the clean-up procedures employed.

The primary commodity hauled by the TRRC trains would be coal. The only fuel or chemicals that would be carried are those that are needed for the operation of the train. These locomotives would carry a maximum of 9600 gallons of diesel fuel. However, it should be noted that these locomotives would probably be fueled in Glendive, Montana, and as a result would have less than 3000 gallons of fuel at the river crossings.

In the event of a fuel spill near the Tongue River, impacts would be confined to the area of the spill and downstream. Small fish and aquatic invertebrates would be most sensitive to any chemical spills.

4.9.2.2 Impact from the Use of Herbicides in Maintaining the Right-of-way

The impacts from the use of herbicides to maintain the ROW would be dependent on the type of herbicide used, the application procedure, the weather at the time of application, and the proximity of the ROW to the river.

The possible over spraying and wind drifting of herbicides should not introduce toxic substances into the river in amounts that would be toxic to aquatic life. The impacts of herbicide use could be minimized by the strict adherence to the label instructions and by using herbicides labeled as safe for use near water.

4.9.2.3 Impact to Aquatic Organisms Due to Coal Dust from Trains

Coal is a relatively inert and insoluble substance. It is unlikely that there would be any chemical effect to aquatic organisms from coal dust given the limit of exposure of the railroad to the Tongue River.

In the event of a train derailment at one of the river crossings, a large amount of coal could potentially enter the river. Most of the damage that would occur from such an event would be from the coal dust which washes off the coal and increases TSS, and from the impact of heavy equipment operating in the river during the clean-up. However, assuming a prompt and thorough clean-up of spills, these impacts should be of a short term duration in a limited area of the river.

4.10 TERRESTRIAL ECOLOGY

Construction and operation of TRRC's preferred alignment or the Four Mile Creek Alternative would directly and indirectly affect vegetation and wildlife in the project area. Direct impacts would include the removal or alteration of vegetation along the ROW and the consequent loss of some wildlife habitat and displacement of some wildlife. Other potential impacts to wildlife include the destruction of relatively nonmotile species, loss of animals due to collision with trains and maintenance vehicles, creation of a barrier to some species, potential damage or elimination of habitat by dust, herbicides, or fire, and disturbances to nearby animals. Indirect impacts would include general demands on the environment which are associated with increased population or use of the area and improved roads. These would include increased wildlife-vehicle collisions on county roads, displacement of wildlife by recreationists, and increased poaching and hunting.

Because the entire railroad right-of-way would be fenced to keep cattle off the tracks, the ROW could act as a barrier to the natural movement and migration of animals, such as pronghorn and deer, that cannot find a way through or around the fencing and that could not or would not use cattle underpasses.

4.10.1 Construction

4.10.1.1 Vegetation

A determination of the total affected vegetation was made using aerial photography, USGS 7.5 minute maps and field inspection. Using these aides, it was determined that the construction of TRRC's preferred alignment would directly affect roughly 637 acres along the ROW. The acres lost to the ROW include a mixture of pine/juniper, grass-

land/sagebrush, agricultural, prairie, deciduous tree/shrub, and breaks habitat. The specific acreages that would be lost and their percentage of the total acres removed are shown in Table 4-35. A total of 781 acres would be affected with the Four Mile Creek Alternative. The acres that would be lost on the alternative include the same types of habitat, with the addition of aquatic lands (cattails/sedge).

Table 4-35. Acreages removed.

HABITAT TYPE	PREFERRED ALIGNMENT[1]	FOUR MILE CREEK ALTERNATIVE
Pine/Juniper	11	79
Silver Sagebrush/Grassland	106	97
Big Sagebrush/Grassland	262	265
Skunkbush Sumac/Grassland	39	26
Breaks	163	159
Agriculture/Disturbed Sites/Pasture	9	14
Greasewood/Grassland	0	0
Prairie	46	139
Aquatic (cattail/sedge)	0	1
Deciduous Tree/Shrub	1	1

[1] All values in acres.

No threatened or endangered plant species or "species of concern" as listed on the Montana Natural Heritage Program have been identified in the area. However, a field search of the alignment should be undertaken during final phase engineering to identify any unique plant species and to implement appropriate mitigation measures.

The most important mitigation measure for impacts to vegetation would be proper planning for the reclamation of disturbed areas. A revegetation plan specific to the proposed ROW corridor should be prepared prior to disturbance. The implementation of the following measures would reduce the level of impact from the rail line's construction:

(1) Revegetation quickly following disturbance.

(2) Selection of suitable species (i.e., slender wheatgrass, streambank wheatgrass, hard fescue, blue grama), by an analysis of site soil characteristics, precipitation patterns, and slope and aspect.

(3) Selection of suitable planting dates, by an analysis of site seed

requirements.

(4) Use of non-native plants if vegetation begins at a time when native species cannot be planted successfully.

(5) Use of species not palatable to wildlife.

(6) Selection of appropriate planting methods, i.e., drill-seeding, hydro-seeding, broadcast-seeding, etc.

(7) Consideration of erosional problems in advance of planting. For example, cut and fill slopes should be reduced to the flattest angle practical. Slopes could be terraced where the reduction of those slopes is impractical. The mulching and planting of trees and shrubs in containers near stream banks could speed revegetation and, thus, control erosion.

(8) Consideration of non-vegetative erosion control measures such as erosion control mats or soil tackifers in particularly sensitive areas.

(9) Periodic inspection of reclaimed acres, including an outline of follow-up measures to insure successful reclamation, especially in areas where soils, slope, or topography impede revegetation.

4.10.1.2 Wildlife

Construction of TRRC's preferred alignment or the Four Mile Creek Alternative would affect primarily two general groups of wildlife -- big-game and birds (upland birds, waterfowl and raptors).

Deer and Pronghorn

The construction phase of the project would remove some deer and pronghorn habitat, primarily the big sagebrush/grassland. This is the most common habitat in the project area (see Table 4-35). Other construction-related impacts that could occur for either alignment include the displacement of wildlife due to increased noise and dust in the construction corridor. The proposed construction season is expected to extend from April to October, a period of comparatively low stress for wildlife. However, should the construction season extend into the winter during periods of higher stress, construction could affect the mortality rate of area wildlife.

Other possible construction-related impacts could be increased "road-kills" due to traffic increases on the Tongue River Road. Construction work centers along the rail line could temporarily displace deer and pronghorn from those areas. Hunting and poaching pressure on local deer and pronghorn populations could increase. Increased recreation pressure (such as camping and hiking) associated with the construction work force (and

potentially, their families) could further displace wildlife and could negatively affect reproductive success (natality).

The available literature suggests that there may be fewer deer and/or wintering deer on the Four Mile Creek Alternative. Moreover, the summer/fall attraction to the agricultural habitat or the bottomlands of the Tongue River Valley would be somewhat less for the Four Mile Creek Alternative.

The overall impact of construction-related displacement on local deer populations should not be great and should be relatively short-term and limited to the duration of construction through a particular area. Moreover, some impacts to deer and pronghorn could be mitigated by timing construction so that important use areas, particularly wintering and fawning areas, are not disrupted. Pre-construction surveys should be conducted to identify as many of these areas as possible.

Upland Birds

Impacts to upland game birds from construction of the railroad would likely be the same for either TRRC's preferred alignment or the Four Mile Creek Alternative. Some habitat for sharp-tailed and sage grouse, pheasant and gray partridge could be removed. Some sharp-tailed grouse leks could be affected by construction at the north end of the project area, either by removal or displacement. Locations of dancing grounds from Birney to the terminus are not well known, so potential impacts to grouse in this portion of the line are difficult to assess. Some pheasant and gray partridge habitat would be disturbed, and some birds would probably be temporarily displaced from the vicinity of construction. Merriam's turkeys would not likely lose much habitat, but birds accustomed to moving periodically from uplands to the riverbottom areas, and birds that winter along the Tongue River could be displaced by noise and activity.

Overall impacts to most upland bird species from construction should be short-term and occur only for the duration of construction. However, native grouse populations in the vicinity of the project area have been depressed for several years. Construction activities on or near dancing grounds and nesting areas could affect local populations of grouse by interferring with reproduction and could reduce overall population numbers with increased hunting.

Some impacts to upland game birds could be mitigated by scheduling construction so as not to conflict with wintering, nesting and brood-rearing areas. These areas could be delineated by pre-construction surveys.

Raptors, Waterfowl, and Other Birds

Several raptor species nest, hunt, or winter on or near the area proposed for construction. Red-tailed hawks, great-horned owls, and American kestrels commonly nest on or near the river bottom. These, and other nesting raptors could be temporarily

displaced, and reproduction could be affected by increased stress. Most other raptor species found on or near the project area hunt in the general vicinity of the proposed railroad. Some hunting and roosting habitat could be removed and some prey species could be lost or displaced. Some raptor species would be displaced, probably only until construction is completed. Given the distance from the Tongue River, it is likely that impacts to raptors during the winter months and the spring nesting season would be lower for the Four Mile Creek Alternative than they would be for TRRC's preferred alignment.

Some construction-related impacts could be mitigated by scheduling construction so that it does not conflict with known raptor nest sites between the time of nest territory establishment and fledging of young birds.

Waterfowl are prevalent in the 2-3-mile section of the Tongue River just north of the Tongue River Dam. Since this section of the river never freezes, it serves as an important winter sanctuary for waterfowl. Waterfowl using the Tongue River or ponds near the area of construction for wintering, nesting or resting may be displaced in the immediate area during the period of construction. This could have a short term effect on waterfowl if displacement took place during winter months or during spring and summer months when geese and ducks are nesting in vegetation between the river's edge and the uplands. Potential spills of materials such as gas, diesel fuel, lubricating oil, solvent, etc., could negatively affect waterfowl species and shore and wading bird species. Herons and other colonial nesting birds such as cormorants could be displaced from nest sites and fishing areas during construction. Construction of the Four Mile Creek Alternative would avoid most of the more sensitive waterfowl wintering nesting areas just north of the dam. The consequent impacts would thus be less.

Scheduling construction so as not to conflict with breeding, nesting, and brood-rearing periods could mitigate some impacts to waterfowl, herons, and other colonial nesting birds and shore birds.

Other Mammals

Small mammal populations found within the area of construction would be displaced or eliminated during construction. Reclamation along the ROW would initially attract small mammals to the revegetated areas. Medium-sized animals such as yellow-bellied marmots, black-tailed prairie dogs, skunks, and porcupines would be displaced from the disturbance area until after construction. Predators and furbearers found in the project area could be displaced until the end of construction.

4.10.1.3 Threatened and Endangered Species

As noted in Chapter 2, the U.S. Fish and Wildlife Service (FWS) has identified three "species of concern" in the TRRC Extension project area -- the bald eagle, the peregrine falcon, and the black-footed ferret. When endangered species may be present and when

these species may be adversely affected by a proposed project, FWS requires the preparation of a Biological Assessment. In consultation and coordination with FWS, TRRC will prepare the Biological Assessment during final engineering if the proposed Extension is approved.

Detailed biological information is available for portions of the project area, including those sections between Ashland and Birney and the sections around Decker. However, there are approximately 28 miles of the proposed Extension route between Birney and the Tongue River Dam where wildlife survey data is limited. TRRC, with the approval of the USFWS, undertook additional wildlife surveys during the winter and spring of 1992 and also consulted with the Montana Department of Fish, Wildlife and Parks in an effort to supplement existing information. These new data are incorporated into this draft EIS and will be used in preparing the Biological Assessment.

Information on the possible impact of the TRRC Extension on "species of concern" is presented below.

Bald Eagle

Since much of the proposed rail line would be constructed in the Tongue River valley bottom, one effect of ROW construction would be the removal of trees that could serve as roosting and nesting habitat for bald eagles. An additional direct effect would be the loss or displacement of such prey species as fish, waterfowl, small and medium-sized mammals, and ungulates. Because of increased noise, dust and activity associated with rail line construction, individual bald eagles known to use the Tongue River upstream of the existing county road bridge could be displaced.

There are two known locations of active bald eagle nests in the Tongue River valley. One nest, north of the Brandenberg Bridge, is within the survey corridor for the already-approved TRRC ROW between Miles City and Ashland. It is located on the other side of the Tongue River, approximately 5 miles from the centerline of the ROW. The nest is near farmland and the county-maintained Tongue River Road. Evidence suggests that the activities associated with both the farm activities and county road traffic have not disturbed the nesting eagles. Given the distance of the nest from the TRRC ROW, the eagles should not be affected by the construction and operation of the railroad.

The second known bald eagle nest in the Tongue River valley is within the survey corridor of TRRC's preferred alignment for the proposed Extension, approximately 8 miles north of the Tongue River Dam. It is .5 miles west of the centerline of the ROW. Given the narrowness of the Tongue River valley at this point, TRRC construction activities could affect the use of the nest, especially if construction activities occurred in early spring. Mitigation of this impact would require timing TRRC construction activities in this location during a period of inactive use of the nest. The Four Mile Creek Alternative would avoid this section of the Tongue River valley.

After construction, bald eagles also could be affected by the operation of trains on the proposed rail line, particularly those birds using the Tongue River canyon--the 2-3 miles of the river valley just north of the Tongue River Dam--during the winter months. Since the Four Mile Creek Alternative would avoid this section of the river valley, there would be few, if any, impacts on bald eagles associated with trains operating on the alternative rail line.

Bald eagles could become accustomed to the activities associated with the operation and maintenance of a railroad, although some maintenance activities could cause short-term displacement. In the canyon area, however, bald eagles could experience the effects similar to other raptors. Upstream of Canyon Creek, as the valley narrows, bald eagles and other raptors could choose not to utilize the adjacent habitats because of train-related activities such as noise, potentially lower numbers of prey, and increased human activity. The later impact should be restricted to the specific maintenance areas and would be of limited duration.

It would be possible for bald eagles to use the area of the proposed rail line north of Canyon Creek where the valley widens and perching sites are available up to 1/4 mile from the ROW. Bald eagle use of this area would be limited, however, to warm weather conditions since the river freezes along this section. If bald eagles nested in the Tongue River valley, this portion of the river could be acceptable to nesting birds. It is distant from the proposed rail line in most places.

Since the eagles generally prefer the areas adjacent to the river, there would be possibly less disturbance to bald eagles were the Four Mile Creek Alternative selected given that the alternative alignment diverges from a section the Tongue River valley. However, even with this alternative, the proposed rail line would extend through areas that are used by raptors, including bald eagles during the winter months.

Peregrine Falcon

The construction and the operation and maintenance of either TRRC's preferred alignment or the Four Mile Creek Alternative could have an impact on the peregrine falcon. However, there has been only one recorded occurrence of a peregrine falcon in the project area. While falcons may occasionally migrate through the area, the peregrine is not known to hunt or nest in the project area.

There is little reason to expect that migratory peregrines would be negatively affected by the operation and maintenance of the railroad. If a peregrine nesting pair did make use of the above mentioned cliffs located between Ashland and Birney, they would not be affected by either the preferred alignment or the Four Mile Creek Alternative. The ROW for both rail lines would not pass near such habitat.

Black-footed Ferrets

The effects of the proposal on black-footed ferrets would depend on whether this species were found in the prairie dog towns within the project area and the effect of construction and operation of the proposed rail line on the prairie dog towns. No resident black-footed ferrets have been observed in the Tongue River valley. However, prairie dog towns do exist within the project area and, since black-footed ferrets may potentially occur in prairie dog towns, the analysis of direct and indirect effects to the ferrets requires the consideration of effects to prairie dogs and prairie dog towns along the preferred alignment and the Four Mile Creek Alternative.

Parts of prairie dog towns could be destroyed if the ROW is constructed through an area inhabited by the animals. Like other small mammals, prairie dogs could be displaced from disturbance areas until after construction. Some prairie dogs could be killed by the operation of construction equipment.

Following construction, prairie dogs could suffer increased mortality directly from trains passing through a habitat area and indirectly through road-kill on the county road. Fires, dust, noise, increased activity, and potential fuel spills could affect prairie dog use of existing habitat during the operation and maintenance of the railroad on either the proposed or the alternative alignment.

The direct and indirect effects to prairie dogs represent short-term losses and should not effect local populations of prairie dogs.

FWS has suggested the possibility that any prairie dog town, or towns, affected by the proposed Extension could be within the boundary of the 10,000-acre prairie dog complex recently located by the BIA/NCT inventory. This prairie dog complex, known as the Northern Cheyenne complex, has been identified as within the boundaries of the Northern Cheyenne Indian Reservation itself. However, the possibility that the ROW would be located 1/2 mile--the parameter established by FWS guidelines--from the complex as it is currently identified is remote, given that there are very few areas where the ROW comes within 1/2 mile of the boundary of the Reservation.

The identification of the Northern Cheyenne complex, at some point, may be extended to include the prairie dog towns within the Tongue River valley outside of Reservation boundaries. Prairie dog towns commonly expand into the Tongue River valley, until local landowners, viewing them as pests, take measures to eliminate them.

If the USFWS or the BIA/NCT inventory team were to include the Tongue River valley prairie dog towns as a part of the complex, those towns would probably represent a very small portion of the complex. The effects to Tongue River valley prairie dog towns because of rail line construction and operation should not have significant effects on this vast complex. The complex as it is currently identified on the Northern Cheyenne Indian

Reservation alone is ten times the size identified by FWS as a viable ferret re-introduction area.

Although no black-footed ferrets have been observed in the project area, the presence of prairie dogs along the rail line suggests the possibility of ferret habitation. As noted in Chapter 6, if the proposed Extension is approved, TRRC would conduct a survey for prairie dog towns during the final engineering. During the course of the survey, consultation would continue with the FWS regarding the status of prairie dog complexes within the ROW. If a complex greater than 80 acres is discovered, a survey for black-footed ferrets would be conducted pursuant to the guidelines established by FWS.

4.10.2 Operation and Maintenance

4.10.2.1 Vegetation

The principal impacts to vegetation from operation of the TRRC, under either the preferred alignment or the Four Mile Creek Alternative, would be caused by the use of herbicides, range fires, and possibly coal dust.

The County Weed Control Act (7-22 MCA 2101-2153, 1989) requires the control of noxious weeds along all ROW. Weeds may be sprayed with herbicides to inhibit the growth of unwanted vegetation. The use of these herbicides could damage native plant species and could increase the likelihood of range fires due to the presence of dead and dying vegetation. The use of mechanical means to control weeds would reduce the extent of impact.

As noted in section 4.1 "Land Use," ranchers in the project area have expressed concern about the increased threat of range fires from passing TRRC locomotives. While posing a threat to ranchers, fires could have a long-term beneficial effect on area vegetation. TRRC, however, plans to implement a rigorous program of fire prevention and suppression along its ROW.

Coal dust emissions from TRRC trains are expected to be small. The Montana Air Quality Bureau has determined that transportation of coal and any ensuing coal dust would not constitute a problem. Consequently, little effect on vegetation is expected from coal dust.

4.10.2.2 Wildlife

Deer and Pronghorn

The operation and maintenance phase of the project would probably continue to cause some displacement of deer and pronghorn from habitat that is adjacent to the proposed railroad or is accessible to recreationists. Increased county road traffic could result in additional road-kills, poaching, and more legal hunting within the project area. If the county road is improved at some time in the future, the likely further increase in human activity on or near the ROW could decrease reproductive success, add stress to wintering animals and compromise the year-round use of some important habitats.

Although some deer could be afraid to cross the ROW to traditional summer-fall feeding areas, it is anticipated that most mule and some white-tail deer would adapt to any railroad traffic and would continue to utilize adjacent habitats. This adaptation could lead to another potential impact in the form of train-deer collisions. Deer would probably continue to cross the fenced ROW at locations other than underpasses and occasionally be struck, especially at night due to train lights. Some deer would adapt to the presence of underpasses and would avoid collisions.

If the ROW were fenced in such a manner as to exclude domestic livestock (especially calves and sheep), this would represent a barrier to movement of pronghorn. Pronghorn require a fence with a bottom wire of no less than 16" from the ground; preferably a smooth strand. However, a bottom wire this high would also probably allow the passage of calves and sheep and thus would not serve the needs of area ranchers. Since pronghorn occur in limited numbers downstream of the Four Mile Creek confluence with the Tongue River, a fenced ROW would probably not have as great an effect. However, the daily and seasonal movements of the larger populations of pronghorn south of this area to the Tongue River dam could be disrupted or stopped by the ROW fence regardless of the route selected. This disruption of daily and seasonal movement could represent a net loss to the pronghorn population in that area.

While the number of animals that would be affected is unclear, it appears that dear and pronghorn populations would be reduced as a result of the construction and operation of either the preferred alignment or the Four Mile Creek Alternative.

Upland Birds

Most of the anticipated impacts to upland birds would be associated with the construction phase of the project. However, operation and maintenance could affect upland birds from train and vehicle collision, increased hunting and poaching. It is expected that there would be some net loss to upland bird populations from operation and maintenance of the railroad.

Raptors, Waterfowl, and Other Birds

Raptors utilizing the habitats on or near the ROW for resting, nesting, and hunting would probably be displaced from those areas in the open country north of Canyon Creek if the proposed Extension preferred by TRRC is approaved and constructed. Those special use areas not adjacent to the ROW would probably not be affected by the increased activity associated with the railroad. Upstream of Canyon Creek, as the valley narrows, raptors could choose not to utilize the adjacent habitats because of noise, increased human activity, and potentially lower prey base. These birds could be permanently displaced.

Bald eagles wintering or nesting along the river upstream of Canyon Creek are attracted to this area because of the open water and waterfowl prey base, as well as to road-killed and winter-killed ungulates and smaller mammals. Eagles could adapt to the kinds of activity associated with operation and maintenance of a railroad. However, some maintenance activity could cause short-term displacement.

Waterfowl, wading and shore birds could be displaced from nesting, brood rearing, resting or winter habitat on the Tongue River because of the continuous disturbance associated with operation and maintenance. Fuel or other hazardous material spills, herbicides, fires and dust could affect waterfowl in the water or on land. Together, these potential impacts could have a negative effect on waterfowl, wading and shore birds in the immediate area. However, there would probably be no significant effect to regional populations.

Adoption of the Four Mile Creek Alternative, since it bypasses the section of the river which does not freeze, could reduce the negative impacts to waterfowl, wading and shore birds.

Other Wildlife

Small and medium-sized mammals could suffer increased mortality through road-kill on the county road, and perhaps from trains if they are attracted to revegetated areas. Fires, dust, noise, increased activity, and potential fuel spills could effect existing habitat. Overall, however, short term losses of small- and medium-sized mammals should not affect local populations.

There could be some negative impacts to predators and furbearers from vehicle and train collisions, increased hunting, trapping, and poaching, displacement, potential spills of hazardous materials, and loss of habitat due to fires. There could be an unmeasurable affect on local populations.

4.11 AIR QUALITY

4.11.1 Construction

The major sources of air pollutants that would be associated with the construction of the proposed Extension are the wind erosion of dust from areas where vegetation is stripped, heavy construction equipment operations, and exhaust emissions from diesel combustion. Generally these emissions would be of short duration and limited to the area of construction occurrence at that time. Moreover, wind erosion could be reduced by revegetation of exposed areas.

Approximately 840 acres of land would be disturbed by the construction of TRRC's preferred. The estimate of wind blown dust emissions from the exposed areas is based on the Universal Soil Loss Equation (USLE). This equation provides an estimate of the tons of particulate emissions per acre per year. The equation variables depend on the soil type, terrain configuration, and climate. For the project area, the resulting emission factor is 0.325 tons/acre/year.

By multiplying the number of acres by 0.325, an estimate of the total particulate emissions associated with construction of the preferred alignment was made. The PM-10 emissions resulting from the wind blown emissions were based on a ratio of 0.5 times the total particulate emissions, which is generally accepted for fugitive wind blown emissions. Using the total disturbed acreage, the maximum total particulate emissions would be 2.22 tons/mile/year and the PM-10 emissions would be 1.11 tons/mile/year.

The second source for air pollutant emissions from the proposed construction would be the heavy duty construction equipment activities. For the preferred alignment, a worst case assumption was made that all construction activities would occur with a scraper. Other equipment would also be involved in the dirt moving such as dozers, graders, and front-end loaders. However, of the vehicles involved, the scrapers produce the maximum emissions and were used in the analysis to represent the most conservative or worst case estimate. The total amount of dirt moved during the construction of the preferred alignment would be 10,217,626 cubic yards. Fuel consumption was estimated at 0.15 gallon of diesel fuel for every cubic yard of earth moved. Using this figure, the amount of diesel fuel combustion occurring during the construction operation would be 1,532,644 gallons for the preferred alignment. Assuming a scraper burns 40 gallons of diesel fuel per hour, the total number of hours of scraper use would be 38,316 hours for the preferred alignment. A scraper would emit approximately 16 pounds of total particulates per hour of activity. Of these particulates, the PM-10 portion would be approximately 7.8 pounds per hour. The total particulate emissions from the scraper operations would be 102.2 tons/year for the preferred alignment. These total particulate emissions equate to 2.43 tons/mile/year, for the preferred alignment line. The PM-10 emissions would be 1.24 tons/mile/year.

Another source of pollutant emissions that would result from the construction of the rail line is the combustion of diesel fuel used by heavy equipment. Pollutants generated by diesel fuel combustion are particulates (TSP and PM-10), sulfur dioxide (SO2), carbon monoxide (CO), hydrocarbons (HC), and nitrogen dioxide (NO2). Using U. S. Environmental Protection Agency formulas for diesel fuel combustion, Table 4-36 summarizes the resulting particulate and gaseous emissions. Table 4-36 also summarizes the particulate emissions from the wind blown emissions and the construction operations.

Table 4-36. Total Emissions from Construction Activities.

	EMISSIONS (Tons/Mile/Year)	
DIESEL FUEL COMBUSTION	Preferred Alignment	Four Mile Creek Alternative
Particulate Matter (TSP)	**0.16**	0.17
10 Micron Particulates (PM-10)	0.16	0.17
Sulphur Dioxide (SO2)	0.19	0.19
Carbon Dioxide (CO)	0.51	0.53
Hydrocarbons (HC)	0.11	0.12
Nitrogen Dioxide (NO2)	1.56	1.61
DISTURBED LAND		
Construction (PM-10)	1.21	1.24
Windblown Dust (PM-10)	1.06	1.11

Should the Four Mile Creek Alternative be constructed, the emissions data would change. The total amount of disturbed acres from the Four Mile Alternative would increase to 1000 acres. Using the same windblown dust emission equation as for the preferred alignment, the total particulate emissions would be 2.11 tons/mile/year and the PM-10 emissions would be 1.06 tons/mile/year. PM-10 emissions for construction would be 1.21 tons/mile/year.

The construction of the Four Mile Creek Alternative would result in 12,402,000 cubic yards of material moved. Diesel fuel usage would total 1,860,300 gallons based on a usage of 0.15 gallon of diesel fuel for every cubic yard of earth moved. Scraper usage would be 46,508 hours. The resulting emissions are summarized in Table 4-36.

4.11.2 Operation and Maintenance

The operation of TRRC would result in air pollutant emissions generally from two areas, the coal dust and the diesel fuel combustion. The maintenance of the railroad would not produce significant emissions of air pollutants.

Specific calculations have not been generated for the emission of fugitive coal dust from coal cars in transit along the railroad. Although no specific numbers are available for the estimating of the fugitive coal dust from the rail cars, some dust could be blown from the hopper cars and affect the immediate area adjacent to the proposed Extension. However, the Montana Department of Health and Environmental Sciences Air Quality Bureau has stated that coal dust should settle to the bottom of hopper cars within the first few miles of the mine site and that it should not pose a threat to Federal, or Montana air quality standards.

The primary source for air pollutants from the operation of the railroad would be the combustion of diesel fuel by the locomotives. Estimates of the annual diesel fuel combustion for the preferred alignment and the Four Mile Creek Alternative are presented in Table 4-37.

Table 4-37. Annual Fuel Consumption (gallons).

YEAR	PREFERRED ALIGNMENT	FOUR MILE ALTERNATIVE
1996	1,262,900	1,894,350
2000	1,262,900	1,894,350
2005	1,578,625	2,368,120
2010	1,578,625	2,368,120

Pollutants generated by diesel fuel combustion are particulates (TSP and PM-10), sulfur dioxide (SO2), carbon monoxide (CO), hydrocarbons (HC), and nitrogen dioxide (NO2). Using U. S. Environmental Protection Agency formulas for diesel fuel combustion, the resulting air pollutant emissions are shown in Table 4-38.

Table 4-38. Estimated Emission Rates from Locomotive Diesel Fuel Combustion (tons/mile/year).

	FOUR MILE CREEK ALTERNATIVE				TRRC PREFERRED ALIGNMENT			
	1996	2000	2005	2010	1996	2000	2005	2010
Particulates (PM-10)	0.56	0.56	0.69	0.69	0.46	0.46	0.58	0.58
Sulfur Dioxide (SO2)	0.58	0.58	0.71	0.71	0.48	0.48	0.61	0.61
Carbon Monoxide (CO)	2.86	2.86	3.52	3.52	2.36	2.36	2.96	2.96
Hydrocarbons (HC)	0.63	0.63	0.77	0.77	0.52	0.52	0.65	0.65
Nitrogen Dioxide (NO2)	6.85	6.85	8.44	8.44	5.67	5.67	7.09	7.09

4.11.3 Air Quality Impacts

Pollutant concentrations from diesel fuel consumption would be highest directly adjacent to the rail line and would decrease rapidly the further from the line that the air moves. The maximum pollutant concentrations for the preferred alignment and the Four Mile Creek Alternative are summarized in the Tables 4-39 through 4-42. All concentration

estimates fall well below the applicable federal and Montana air quality standards as well as below the Class II increments (see Tables 2-9 and 2-10). The pollutant concentrations are also well below the Class I increments for the Northern Cheyenne Indian Reservation.

Table 4-39. Estimated Maximum 24-Hour Pollutant Concentrations Due to Locomotive Emissions.

	FOUR MILE CREEK ALTERNATIVE				TRRC PREFERRED ALIGNMENT			
	1996	2000	2005	2010	1996	2000	2005	2010
Particulates (PM-10)	1.7	1.7	2.0	2.0	1.4	1.4	1.7	1.7
Sulfur Dioxide (SO2)	1.8	1.8	2.1	2.1	1.5	1.5	1.8	1.8
Carbon Monoxide (CO)	8.7	8.7	10.5	10.5	7.2	7.2	8.8	8.8
Hydrocarbons (HC)	1.9	1.9	2.3	2.3	1.6	1.6	1.9	1.9
Nitrogen Dioxide (NO2)	20.2	20.2	25.4	25.4	16.7	16.7	21.3	21.3

Table 4-40. Estimated Maximum 1-Hour Pollutant Concentrations Due to Locomotive Emissions (Micrograms per cubic meter).

	FOUR MILE CREEK ALTERNATIVE				TRRC PREFERRED ALIGNMENT			
	1996	2000	2005	2010	1996	2000	2005	2010
Particulates (PM-10)	13.6	13.6	16.8	16.8	11.2	11.2	14.1	14.1
Sulfur Dioxide (SO2)	14.5	14.5	17.6	17.6	12.0	12.0	15.1	15.1
Carbon Monoxide (CO)	72.0	72.0	88.7	88.7	59.4	59.4	74.6	74.6
Hydrocarbons (HC)	16.6	16.6	20.4	20.4	13.7	13.7	17.2	17.2
Nitrogen Dioxide (NO2)	169.9	169.9	209.3	209.3	140.6	140.6	175.8	175.8

Table 4-41. Estimated Maximum 24-Hour Pollutant Concentrations in the Northern Cheyenne Indian Reservation (Micrograms per cubic meter).

	FOUR MILE CREEK ALTERNATIVE				TRRC PREFERRED ALIGNMENT			
	1996	2000	2005	2010	1996	2000	2005	2010
Particulates (PM-10)	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Sulfur Dioxide (SO2)	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Carbon Monoxide (CO)	0.8	0.8	1.1	1.1	0.7	0.7	0.9	0.9
Hydrocarbons (HC)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nitrogen Dioxide (NO2)	2.1	2.1	2.5	2.5	1.7	1.7	2.1	2.1

Table 4-42. Estimated Maximum 1-Hour Pollutant Concentrations in the Northern Cheyenne Indian Reservation (Micrograms per cubic meter).

	FOUR MILE CREEK ALTERNATIVE				TRRC PREFERRED ALIGNMENT			
	1996	2000	2005	2010	1996	2000	2005	2010
Particulates (PM-10)	1.0	1.0	1.2	1.2	0.8	0.8	1.0	1.0
Sulfur Dioxide (SO2)	1.1	1.1	1.3	1.3	0.9	0.9	1.1	1.1
Carbon Monoxide (CO)	5.1	5.1	6.2	6.2	4.2	4.2	5.2	5.2
Hydrocarbons (HC)	1.1	1.1	1.3	1.3	0.9	0.9	1.1	1.1
Nitrogen Dioxide (NO2)	12.0	12.0	14.6	14.6	9.9	9.9	12.3	12.3

4.12 NOISE

TRRC's preferred alignment and the Four Mile Creek Alternative, would increase the ambient noise levels in the project area's predominantly rural setting. While the construction of the rail line would result in a short term increase in noise levels, the operation of the railroad would generate noise levels that would rise incrementally as more trains would be required with increases in coal production.

4.12.1 Construction

The operation of heavy machinery during the construction of the railroad would temporarily increase noise levels in the construction area. Measured on the "A" scale of decibel readings, the noise levels from heavy machinery typically used in rail line construction would range between 62 and 74 dBA at a 500-foot distance and between 54 and 67 dBA at a 2,000-foot distance.[13] During times of intense construction activity, the decibel readings could reach higher levels.

The analysis of potential noise impacts included an identification of "sensitive receptors." A "sensitive receptor" is defined as a residence, school, hospital, and recreation area. The analysis was undertaken by reviewing 7.5 minute USGS maps and by field verification.

The number of sensitive receptors that would experience construction-related noise is presented in Table 4-43 and Table 4-44 for TRRC's preferred alignment and the Four

[13] The noise levels are based on the assumption that on a one-mile segment there would be 13 scrapers, 7 bulldozers, 4 graders, 4 rollers, 4 trucks, 1 backhoe, and a vibratory tamper and this machinery would operate at full load with no attenuation. See 1983 TRRC DEIS:A6-1 and A6-15 and Interstate Commerce Commission, *Draft Environmental Impact Statement, Somerset Railroad Corporation, Construction and Operation of a Line of Railroad in Niagara County, New York*, Washington, D.C., September 5, 1980, pp. IV-40 through IV-50.

Mile Creek Alternative. Along the TRRC's preferred route, a total of 25 structures, including residences, one school, one church and one cemetery would experience noise levels within the 500-foot contour. If the Four Mile Creek Alternative was assumed, 26 structures, some of which are residences, one school, two churches, and one cemetery would be affected by noise levels within the 500-foot contour. The noise levels expected at the distance of 2,000 feet would be experienced at a total of 48 structures, including some residences, one school, one church and one cemetery along TRRC's preferred alignment. Assuming the Four Mile Creek Alternative, 44 structures, including possible residences, one school, two churches and one cemetery would be affected by noise levels within a 2,000-foot contour.

Table 4-45 presents the numbers of sensitive receptors within Birney that would experience construction-related noise. The increase in noise levels associated with the 500-foot contour would affect 17 structures, including residences, as well as one church and one school. The noise expected within the 2,000-foot contour would be experienced at an additional 11 structures, including residences, in Birney and at the community's church and school.

Construction-related noise impacts would be mitigated for most rural residents by the dispersal of heavy equipment along the ROW and by minimizing construction during evening hours and week-ends. One way to mitigate noise impacts to residents of Birney would be to locate the proposed Birney-area construction center outside of the 2,000-foot contour in an area with natural features to buffer the noise that would result from the concentration of machinery at the area.

4.12.2 Operation and Maintenance

The operation of the TRRC Extension would cause some long term increase in noise for the rural residents living in the vicinity of either TRRC's preferred alignment or the Four Mile Creek Alternative. Decibel readings of ambient noise levels typical of rural areas range from 20 to 40 dBA. By the end of the analysis period (2010), assuming the operation of 10 trains a day, these readings could increase to 62.8 dBA, an Leq measurement, or 69.2 dBA, an Ldn measurement.[14]

[14] The notations "Leq" and "Ldn" are decibel measurements of the average sound level experienced at a specific location during a 24-hour period. The two notations differ in that the Ldn measurement weighs night-time noises more heavily than daytime noise to recognize a person's increased sensitivity to night-time noise.

Table 4-43. Sensitive Receptors, TRRC Preferred Alignment.

	Construction Contours		Operating & Maintenance Contours		
U.S.G.S. Quadrangle	500 feet	2,000 feet	70-dBA	65-dBA	55-dBA
Proposed Extension and Four Mile Creek Alternative					
Green Creek, MT (1966)	0	1 structure	0	0	1 structure
Birney Day School, MT (1966/1985)	0	0	0	0	0
Browns Mtn., MT (1966)	0	0	0	0	0
Birney, MT (1966/1976)	22 structures 1 school 1 church 1 cemetery	34 structures 1 school 1 church 1 cemetery	0	11 structures 1 cemetery	34 structures 1 school 1 church 1 cemetery
Birney SW, MT (1967)	0	1 structure	0	0	1 structure
Spring Gulch, MT (1967)	2 structures	10 structures	0	2 structures	10 structures
Tongue River Dam, MT (1967)	1 structure	2 structures	0	0	2 structures
Decker, MT (1967)	0	0	0	0	0
Structures Schools Churches Cemeteries	25 1 1 1	48 1 1 1	0 0 0 0	13 0 0 1	48 1 1
Total	28	51	0	14	51

Table 4-44. Sensitive Receptors, Four Mile Creek Alternative.

	Construction Contours		Operating & Maintenance Contours		
U.S.G.S. Quadrangle	500 feet	2,000 feet	70-dBA	65-dBA	55-dBA
Proposed Extension and Four Mile Creek Alternative					
Green Creek, MT (1966)	0	1 structure	0	0	1 structure
Birney Day School, MT (1966/1985)	0	0	0	0	0
Browns Mtn., MT (1966)	0	0	0	0	0
Birney, MT (1966/1976)	22 structures 1 school 1 church 1 cemetery	34 structures 1 school 1 church 1 cemetery	0	11 structures 1 cemetery	34 structures 1 school 1 church 1 cemetery
Birney SW, MT (1967)	0	1 structure	0	0	1 structure
Spring Gulch, MT (1967)	1 structure	4 structures	0	0	4 structures
Tongue River Dam, MT (1967)	0	0	0	0	0
Half Moon Hill, MT (1967/1978)	3 structures 1 church	4 structures 1 church	0	3 structures 1 church	4 structures 1 church
Decker, MT (1967/1978)	0	0	0	0	0

Table 4-44. Sensitive Receptors, Four Mile Creek Alternative.

	Construction Contours		Operating & Maintenance Contours		
U.S.G.S. Quadrangle	500 feet	2,000 feet	70-dBA	65-dBA	55-dBA
Structures	26	44	0	14	44
Schools	1	1	0	0	1
Churches	2	2	0	1	2
Cemeteries	1	1	0	1	1
Total	30	48	0	16	48

Table 4-45. Sensitive Receptors Specific to Birney.[1]

	Construction Contours		Operating & Maintenance Contours		
	500 feet	2,000 feet	70-dBA	65-dBA	55-dBA
Structures	17	26		6	26
Schools	1	1	0		1
Churches	1	1	0		1

[1] Based on the U.S.G.S. quadrangle, Birney, MT, 1967 (photo inspected 1976) and field trip updates.

The ICC requires the assessment of noise impacts to sensitive receptors (e.g., schools, hospitals, recreation area, and in rural areas, ranch homes) when baseline levels experience a 4 decibel increase or when the noise level of 65 decibels is exceeded.[15] To meet the ICC requirement, the calculation of a noise contour, the maximum distance from the rail line's centerline that would experience a specified decibel reading, is required. Because Ldns account for people's increased sensitivity to noise at night, the Ldn value is used in the equation to calculate the contour's distance from the centerline. The sensitive receptors located within a noise contour were determined from U.S. Geological Survey (USGS) quadrangle maps and from a field check.

To allow a comparison with the 1985 TRRC EIS, contours for 55 dBA and 70 dBA levels were calculated in addition to the 65 dBA contour currently required by the ICC.[16] The following distances were calculated: a 55-dBA contour equalled 2630 feet; a 65-dBA contour equalled 263 feet; and a 70-dBA contour equalled 83 feet. Sensitive receptors located within each of these contours then were counted. The findings of this methodology--i.e., sensitive receptor counts--for TRRC's preferred alignment and the Four Mile Creek alternative are presented in Table 4-43 and Table 4-44.

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[15] 49 CFR 1105.7 (6).

[16] To calculate the Ldn contours, the following equation was used:
Distance = (100 feet) {(10) exponent [(Ldn - dBA (55 or 65 or 70)/k]}
k = 10, a value when there is a clear and unobstructed view of the trains, where the ground is hard, and where there are no intervening structures.

No sensitive receptors would be affected by noise levels as high as 70-dBA along either TRRC's preferred alignment or the Four Mile Creek Alternative. Noise levels of 65-dBA, however, would be experienced at 13 structures, including some residences, and one cemetery along the route of the preferred alignment. Assuming the route of the Four Mile Creek Alternative, 15 structures including one church, as well as the same cemetery, would be affected by 65-dBA noise levels. Considerably more sensitive receptors along both the proposed and alternative routes would be affected by noise measured at 55-dBA: a total of 50 structures, possibly including residences, one church, and one school and the same cemetery along TRRC's preferred alignment and a total of 47 structures, possibly including residences, two churches, and one school and again the same cemetery along the Four Mile Creek Alternative.

Table 4-45 provides the numbers of residences and other sensitive receptors within Birney that would be affected by noise levels of 70-dBA, 65-dBA, and 55-dBA. Although no Birney residences were located within the 70-dBA contour, the proximity of two or three residences to this contour warrant attention. The closeness of Birney's church and school to the 65-dBA contour line also require notice because of their significance as sensitive receptors and given the preliminary design of the rail line's route near Birney.

The Tongue River Reservoir State Recreation Area is located near the southern end of TRRC's preferred alignment. The 55-dBA noise contour would encroach on the recreation area. The areas that would not experience noise related to a 55-dBA noise contour would be the points, or peninsulas, located in the northwest quarter of section 25 and in the southeast quarter of section 26 in Township 8 South, Range 40 East. The 65-dBA noise contour would affect the most northern part of the recreation area, where the rail line approaches the shore in the west half of the northwest quarter of section 13 in Township 8 South, Range 40 East.

The rural residents living within the 55-dBA and 65-dBA contours would primarily experience aggravation from the passing trains. The 65-dBA contour would prove to be the most intrusive of the two contours.[17] The EPA has determined that exposure to a Ldn level of 70 dBA over an long period of time (e.g., 40 years) would be required to produce a hearing loss. This level of noise would not affect anyone given that the Ldn contour of 70 dBA estimated for TRRC's preferred alignment and the Four Mile Creek Alternative would lie within the right-of-way of most of the alignment.

[17] Table A6-4 on p. A6-6 of the 1983 TRRC DEIS for depiction of sound levels and human response. The 65 dBA level is identified as intrusive.

4.13 IMPACTS TO THE NORTHERN CHEYENNE INDIAN RESERVATION AND TO THE CROW INDIAN RESERVATION

In assessing the impacts to Native Americans, particularly the Northern Cheyenne, we conducted as full and complete an analysis as possible. In doing so, we considered the potential impacts (including socio-economic) on Native Americns who live near the project and (2) sought ways to avoid unnecessary interference with tribal cultural values and religious practices. We relied on a variety of informational sources. As stated earlier, this draft EIS is tiered to and relies, in part, on the report which the Bureau of Land Management prepared in its analysis of impacts to Native Americans from increased coal mining in the Powder River basin of Montana entitled Draft Economic,Social, Cultural Supplement, Powder River I Regional EIS, published in June 1989. Though the final EIS in the BLM proceeding, which was published in June 1990, made some adjustments in the anticipated volume of coal production, the anticipated environmental impacts to Native Americans remained substantially the same as those presented in the draft EIS.

We have also relied on the report prepared for the Commission by Ethnoscience[18] entitled "Potential Cultural Effects on the Northern Cheyenne From the Proposed Tongue River Railroad Extension," June 1991. We also considered information obtained through consultation with and comments from the representatives of the Northern Cheyenne Tribe. We requested comments from other potentially affected Native Americans.

We also considered the information contained in TRRC's Environmental Report which was submitted with its application to the Commission. As previously discussed, we also considered the comments submitted during the EIS scoping process. In addition, we consulted with various Federal, state and private organizations such as BLM, U.S. Department of Interior, Bureau of Indian Affairs, the Montana Governor's Office, the Montana State Historic Preservation Officer, the Advisory Council on Historic Preservation, and the Medicine Wheel Alliance.

It is important to note that within both the Northern Cheyenne and Crow Indian Tribes there are varying view points about the proposed rail line construction and operation. For example, some Northern Cheyenne are concerned that the proposed construction and operation and the probable increased regional coal development could negatively and unfairly impact the social and economic structure of the Reservation. Others are concerned that the proposal could impair or destroy certain aspects of the traditional life style maintained by and important to many individuals and communities on the Reservation.

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[18]Ethnoscience is a consulting firm located in Billings, MT, which specializes in ethnographic impacts to Native Americans.

Some members of the Northern Cheyenne Tribe maintain that, if the railroad and associated regional coal development could guarantee increased prosperity on the Reservation, the Tribal government would view such a guarantee as mitigation or compensation for some of the potential negative impacts. They suggest that these mitigation measures could include allocation to the Tribal government of a larger portion of state and county funds derived from coal mining to enable the Tribal government to provide and administer improved public services and facilities. Additionally, they also request guaranteed employment with the railroad and the coal mining industry.[19] They state that with such mitigation, the proposed Extension and associated coal development might be viewed as beneficial to the Reservation.

Some members of the Crow Tribe also view the proposal favorably, particularly the related regional coal development, since the Tribe has an interest in active mines adjacent to the Reservation as well as coal reserves on the Reservation. However, there are some Crow Tribal members who believe that the impacts from increasing regional development would serve to weaken traditional values and place added stress on the Tribe's ability to maintain traditional religious practices and lifestyles.

Historically, a number of Tribes, such as the Northern Cheyenne, Crow, Arapaho, Oglala and Minicongjou lived and hunted in this region. However, this analysis focuses primarily on the impacts to the Northern Cheyenne because of the Reservation's proximity to the proposed Extension. Although still within the area of impacts, particularly from increasing regional coal development, impacts to the Crow Reservation are discussed more generally because of the Reservation's further distance from the proposed Extension.

In considering the Native American concerns discussed below, we have recommended that any ICC decision approving the proposed construction and operation be subect to the mitigation set forth in Chapter 6, "Recommended Mitigation and Request for Comments." Also, we encourage the TRRC to hire Native Americans, where possible.

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[19] We note that notwithstanding the federal agencies' broad fiduciary obligtions to Native Americans which is akin to that of a guardian and a ward (the "federal Trust" responsibility), this special relationship does not require the ICC to impose conditions to protect and preserve the tribe's economic self development. It seems clear that as long as the ICC has considered the socio-economic and cultural impacts of a project on Native Americans, it can approve a project (without mitigating conditions of the type requested here) despite claims that the proposed project would disrupt important cultural and economic aspects of tribal life. See Star Lake Railroad Company - Rail Construction aand Operation in McKinley County, New Mexico, No. FD-28272 (ICC Dec. 7, 1984), affirmed in New Mexico Navajo Ranchers Ass'n v. ICC, 702 F.2d 729 (D.C. Cir. 1988)

4.13.1 Impacts to the Northern Cheyenne Indian Reservation

Social and Economic

Neither the proposed TRRC Extension nor the Four Mile Creek Alternative would cross the Northern Cheyenne Indian Reservation. However, construction of the railroad and the eventual development of coal mines in the Ashland/Birney area could have social and economic impacts on the Northern Cheyenne. Most of the potential for impact would occur as a result of coal mining, which is considered an action "related" to the construction of the Tongue River Railroad.[20]

Social and economic impacts to Northern Cheyenne that are associated with the construction and operation of the TRRC Extension would result primarily from 1) in-migration of Northern Cheyenne in search of coal-related employment 2) the settlement of non-Native Americans in reservation communities if off-reservation housing facilities prove inadequate 3) increased regional population and commensurate increased Northern Cheyenne contact with non-Native Americans.

The measurement of impacts (High Baseline Alternative) presented in the BLM Supplemental EIS includes the TRRC rail line construction and operation from Miles City to Ashland to the Montco mine, and four proposed mines with an anticipated combined tonnage of 22 million tons per annum through the BLM analysis period of 2005. This tonnage is slightly higher than the 17-19 million ton projection for coal produced in the TRRC service area (Miles City to Decker).

BLM's measurement of potential impacts does not differentiate between expenditures associated with natural population increase and expenditures associated with in-migration. For the purpose of this study, it has been assumed--based on BLM's assumption that in-migration could account for 10 percent of population increase between 1989 and 2005--that 10 percent of expenditures are related to the proposed TRRC Extension.

Data collected for the BLM Supplemental EIS created a baseline portrait of the Northern Cheyenne community against which the proposed TRRC Extension can be evaluated:

BLM assumed, based on previous coal development, that

1) Northern Cheyenne will return to the Reservation in search of coal-related employment.

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[20]It should be noted that the impacts to Native Americans associated with the actual permitting and development of any new coal mines would be addressed in environmental documents prepared by those Federal and/or state agencies with applicable jurisdiction.

2) Natural population increase, distinct from in-migration, should average 1.7 percent per year.

3) The Northern Cheyenne economy's downward spiral is expected to continue through 1990 and then stabilize.

4) The Native American hiring rate (including both Crow and Northern Cheyenne) in the coal mines is expected to remain at 3.5 percent of all mine employees. This percentage is based on past hiring practices by mines not signatory to a Native American hiring agreement.

Coal development was a recognizable inducement to in-migration from 1970 to 1978. However, the 1979 to 1982 migration pattern corresponds to both off-reservation coal development, on-reservation oil and gas exploration, and increased on-reservation job opportunities; revenues related to tribal-owned mineral resources supported increased tribal programs and employment on the reservation. Moreover, accelerated U.S. Department of Housing and Urban Development (HUD) building programs improved the availability of housing on the reservation. These developments, unrelated to coal development, could also have inspired in-migration.

BLM estimates that between 200 and 250 Northern Cheyennes will return to the Northern Cheyenne Indian Reservation in response to employment opportunities attributable to anticipated regional coal development. This represents approximately 10 percent of the projected total population increase of 2,013, based on 1.7 percent natural population increase.

It is assumed that much of the past in-migration was due to the Montana Power and ARCO hiring agreements and the commensurate expectation of significant and legally assured employment opportunities for Native Americans. However, since these agreements have lapsed, it is not clear that development outside such agreements would induce the same population increases. This uncertainty increases the difficulty of projecting Northern Cheyenne population changes resulting from action related to the proposed TRRC Extension.

Non-Native American migration to the Northern Cheyenne Indian Reservation between 1970 and 1985 was insignificant, in part because of the existence of company housing in Colstrip and the dearth of housing for non-Native Americans on the Reservation. Racial tension may also have limited non-Native American migration to the Reservation. However, non-Native American presence on the Reservation could increase if adequate housing facilities are not developed in off-reservation communities. According to anticipated regional development, BLM estimates that non-Native American migrants to the Reservation will total about 60 individuals by the year 2005. The majority of these migrants are expected to settle in Lame Deer and Ashland Village.

The mine projects that are related to construction of the TRRC Extension would offer employment opportunities to area residents, including Northern Cheyenne. Construction of the railroad also would increase the marketability of abundant low sulfur coal reserves located within the boundaries of the Northern Cheyenne Reservation, should the tribe decide to pursue that course of development.

TRRC estimates that, during the construction phase, five percent of the 40 percent of the work-force projected to be local will be from Lame Deer and Crow Agency. Assuming approval, construction would continue for approximately three years based on a seven month construction season. Twenty employees could be retained during the off-season and as many as 728 could be hired during peak construction. The average work-force during the seven month construction season is projected at 478. It is thus estimated that for seven months a year, for three years, 24 Native Americans (3.5 percent) could be employed by TRRC. Although tribe-specific hiring projections are not available, it is assumed that, given the distance between the Crow Reservation and the proposed rail line construction and operation, the majority of Native American employees would be Northern Cheyenne.

It is also projected that TRRC will have 64 employees engaged in operation/maintenance by the year 1995; 72 by the year 2000, 81 by 2005, and 94 by 2010. An undetermined number of these employees could be Native Americans from either the Northern Cheyenne and Crow Indian Reservations.

The current Northern Cheyenne labor force differs significantly from that present during coal development in the 1970's when relatively few Native Americans were hired. In 1970, only 25 percent of adult Northern Cheyenne had a high school degree or its equivalent. The 1980 census reported a 65 percent graduation rate and an informal 1977 survey (targeting two thirds of the adult reservation population) indicated that 66 percent of all adults, twenty years and older had a high school degree. These later numbers compare favorably to the education levels of non-Native Americans within the project area. Moreover, an increased number of Northern Cheyenne now have some experience or some training (via the Dull Knife Memorial College vocational program) in energy sector jobs. This increased level of qualification should lead to Native American employment above 1970-1985 levels.

It is difficult to assess whether the opportunities that come with industrial development would be sufficient to offset the socio-economic problems that are noted in the BLM Supplemental EIS. The unemployment rate among Tribal members was approximately 30 percent in 1970 and in 1975, approximately 35 percent in 1980, and over 50 percent by the mid 1980s. Coal-related employment gains have been offset by increased numbers of people looking for work. In 1970, Tribal income was less than 50 percent of off-reservation income. In 1985, it was less than 25 percent. The level of poverty for the Reservation as

a whole increased notwithstanding the regional coal development that took place between 1970-1985.

The unemployment rate, though in part the result of in-migration in excess of coal-related employment opportunities, is also attributable to factors divorced from coal-development. Employment was curtailed as programs paid for with discrete one-time payments related to on-reservation mineral exploration were eliminated. Services and public administration account for 23 percent and 40 percent, respectively, of the Northern Cheyenne economy. Cuts in Tribal revenue and Federal social programs thus had major economic ramifications. However, the juxtaposition of increased regional prosperity with increased tribal poverty has led many Northern Cheyenne to charge that they are paying the price for coal without realizing any of the benefits. The impacts that are related to this development focus primarily on the lack of housing and public services on the reservation, as well as impacts on traditional Northern Cheyenne culture.

Reservation housing facilities are currently inadequate. In 1987, the Northern Cheyenne Housing Authority had more than 200 families on its low-rent housing waiting list and 100 families on its mutual help (homes to purchase) list. BLM reported that 80 new HUD housing units were slated for construction in 1988; following this development, it was estimated that there would still be a housing shortage of 420 units. Development of additional public-housing facilities is hindered by an increasing lack of Tribal and Federal funds. In-migration of Northern Cheyenne would thus further tax already-inadequate housing facilities.

Because of restrictions on non-Indian purchase of Reservation land and housing facilities, non-Indian accommodations are essentially limited to space in three mobile home courts located within Lame Deer and at 5 homes and 5 vacant lots within tribal fee land.[21] Expansion of housing facilities for non-Native Americans is limited both by restrictions on the sale of Tribal land to non-Northern Cheyenne and by problems in securing loans necessary for the expansion of private mobile-home parks.

Increased population both on and off the Northern Cheyenne Indian Reservation would increase the demand on already over-taxed services and infrastructure. Those services most vulnerable to negative impact are water and sewage, health and social services, and law enforcement. These services are already operating beyond capacity.

For the purpose of this analysis, it has been estimated that approximately 10 percent of new fiscal expenditures can be attributed to TRRC's construction rail line construction project and related actions. This corresponds to the roughly 10 percent estimate for in-migration of Northern Cheyenne under the BLM's High Baseline Alternative.

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[21] Non-Native Americans can purchase reservation fee lands. These lands, however, account for only 2 percent of the total reservation acreage.

By 2005, water availability on the Reservation would need to increase by 293,100 gallons a day, water storage by 488,600 gallons and sewage treatment by 195,400 gallons a day to meet needs engendered by both natural population increase and in-migration. If HUD funds are obtained for housing, Indian Health Service (IHS) funding would be made available for matching sewer and water systems. If additional housing is not built, current facilities would be stressed by the doubling or tripling of families in existing housing. While Ashland and Birney have excess water and sewage system capacities, the Lame Deer system is operating at a maximum level. Solid waste canister facilities are also overtaxed and will need to be expanded to meet needs engendered by both natural population increase and in-migration.

Six additional police officers are required just to meet current needs; this shortage would be exacerbated by population increases associated with in-migration. In addition to demand created directly be reservation population growth, the police would need to respond to more traffic accidents and violations due to increased regional traffic passing through the reservation, more crime associated with increases in alcohol and drug abuse, and more disputes involving Native Americans and non-Native Americans. The already-overcrowded Tribal court would be impacted accordingly.

All Americans with one-sixteenth Indian blood are eligible for free health care provided by IHS and the Northern Cheyenne Tribal Health Administration.[22] Increased Indian population resulting from in-migration associated with the TRRC's related actions would place further stress on these already overtaxed services; a doctor, a dentist, and three nurses are needed for the IHS just to accommodate current demand.

The Reservation Alcohol, Family Services, and Community Health programs are also currently undermanned and under-funded and will have to be expanded to meet natural population increase as well as in-migration of Native Americans. Ambulance and urgent care services would also be impacted by increases in regional population and in-migration of Northern Cheyenne.

Because IHS-Federal appropriations are based in part on the service population it is possible that IHS funding will increase as the on- and off-reservation population increases. This would partially mitigate the negative fiscal impact incurred by in-migration and increased regional population.

Social programs on the Reservation, including general assistance, child welfare and day care, alcohol and drug abuse programs, energy assistance, and HUD elderly housing, are financed with Federal and Tribal funds and administered by tribal agencies. These services are all under-funded and understaffed and would be further taxed by increased

[22] The Northern Cheyenne Tribal Health Service is responsible for reservation ambulance and transfer services, community health services, and other ancillary health care programs.

clientele associated with in-migration, particularly if mining and railroad employment expectations are not met. More than four new social workers, in addition to the six needed to meet current (1986) demand, would be required to accommodate natural population increase and in-migration.

Adult Education Programs and the Job Training Partnership Act are financed with federal funds administered by the Tribe's Career Development Office. The programs are inadequate for current needs. Demand from current residents and in-migrants seeking coal-related employment could further over-tax these programs.

With respect to the traditional Northern Cheyenne culture, negative impacts resulting from the proposed action could include Tribal divisiveness, loss of cultural isolation/identity, and commensurate threats to social well-being. Concern over these particular impacts is heightened by the Northern Cheyennes' belief that they will pay these costs without realizing any of the economic benefits associated with the proposed development.

Coal development has created a wider spread of income, not only between Native Americans and non-Native Americans in southeastern Montana but also within the Reservation community. In 1970, tribal income was less than 50 percent of off-reservation income. In 1985, it was less than 25 percent. The level of poverty for the Reservation as a whole increased in the face of regional coal development, 1970-1985. At the same time, a small number of Northern Cheyenne tribal members secured energy-sector employment. While prosperity allowed those individuals to contribute more generously to Tribal community funds, it also introduced social and economic schisms previously unknown on the reservation. Debate over the advantages and disadvantages of on- and off-reservation coal development has also contributed to inter-tribal conflict.

The cultural and physical isolation of the Reservation is seen as an important factor in the Northern Cheyenne sense of tribal and personal identity. This isolation has been challenged by improved transportation, the need to leave the Reservation for shopping, employment, and education, and exposure to non-Indian culture through television. Regional coal development, 1970-1985, has further eroded this cultural isolation. Coal and power company scholarships and training programs, access to a work place in which Northern Cheyenne are a marked minority, voluntary busing of pupils to the better-funded Colstrip schools where there is little empathy for Northern Cheyenne values, and overall regional population increases have increased the likelihood of contact between Northern Cheyenne and those with whom they do not share kinship, Tribal membership, language, history, or culture.

This increased contact, attendant to any extensive coal development in the area, is associated with increases in violent crimes, racial conflict, discrimination, alcohol and drug availability and abuse, and the alienation of Northern Cheyenne young people from their culture and their families.

The potential overload of Reservation facilities by returning and possibly unemployed Northern Cheyenne has the potential to affect the social well-being of the Northern Cheyenne. Ills associated with over-population and increased poverty include overcrowding, family violence, increased depression and suicide, increased juvenile delinquency, increased crime, and increased alcoholism. These social problems could, in turn, diminish the Northern Cheyenne's ability to practice their traditional religion and teach their children Cheyenne culture, history, language, and values.

Tribal revenues are not expected to increase as a direct result of the proposed Extension or any coal development or other related actions. Off-reservation coal and railroad taxes would generate no direct Tribal revenue. The Northern Cheyenne Indian Tribe has no taxing authority and thus would not realize revenue from increased population or income. Furthermore, tribal budgets, highly dependent upon the lease of tribal resources and federal grants, have been diminishing since 1986. This decline is expected to continue. The Tribe may thus be unable to accommodate service demands associated with natural increase, in-migration, or regional expansion.

Loan acquisition for on-reservation development has historically been limited for Native Americans and non-Native Americans alike; lenders fear that they might not have access to collateral in the event of a foreclosure since county law enforcement officials have no tribal jurisdiction. Because Tribal revenue would not increase directly as a result of the proposed Extension or its related mine developments, the Tribe's ability to address increased service demands would depend in large part upon state, federal, and corporate funding.

Any potential impact from the proposed TRRC Extension or its related actions would primarily affect the Northern Cheyenne Indian Reservation. There are five distinct communities on the Reservation: Ashland Village, Birney Village, Busby, Lame Deer, and Muddy District, though only Birney Village and Ashland Village are within the project area of the proposed Extension. Lame Deer, the largest and most culturally diverse community, houses the Tribal government offices, the Indian Health Service, the BIA Northern Cheyenne office, and most other reservation services. It is also at the junction of the major roads leading through the Reservation. The majority of returning Northern Cheyenne are expected to settle in Lame Deer. Lame Deer, however, is the Reservation community best able to absorb social change.

Muddy District is composed primarily of clusters of Northern Cheyenne Housing Authority residences. The lack of a community center would hinder the district's ability to deal with those social problems associated with inter-racial tensions, poverty, and population influx. The district, however, is across the Reservation from the proposed TRRC Extension and related mines. Thus, though subject to the service shortages expected to befall the entire Reservation, Muddy District is not as vulnerable to those impacts associated with increased contract with non-Native Americans.

Busby, the site of the Bureau of Indian Affairs operated K-12 school, is known for its community cohesiveness and the active involvement of its residents in community issues. That community cohesion, coupled with the strong church and school drug and alcohol abuse programs and Busby's relative distance from the proposed railroad alignment and related mines, makes Busby less vulnerable to negative social impacts than Birney Village or Ashland Village.

Birney Village, the on-reservation counterpart of Birney, is the most physically and culturally isolated of the Reservation communities. This isolation is highly valued by Birney's elderly and traditional population. Birney Village is particularly vulnerable to the social impact that could result from the TRRC extension and related actions due to its proximity to the proposed railroad and to the seasonal construction centers that are expected to be established in the vicinity.

Ashland Village, the on-reservation portion of Ashland and bordered to the east by the proposed rail line, is also a traditional community highly vulnerable to social and economic impacts associated with development. Returning Northern Cheyenne and any non-Native Americans settling on the reservation are expected to settle in Ashland Village due to the presence of HUD housing. The isolation of the village is also threatened by its proximity to Ashland and by the population growth predicted for that community.

Impacts to Terrestrial Ecology

Wild plants such as Sweetgrass, Big Medicine and cattails, which are important for medicine or religious ceremonies, are regularly collected from the valley on the east side of the Tongue River. Some wild plants make up part of the subsistence base of Birney residents in particular. Depending on the final route selection, one or more traditional localities for collecting ceremonially significant plant resources may be disturbed or eliminated. Moreover, right-of-way fencing could block access to traditional gathering locations.

Impacts to Cultural Resources and Religious Practices

Besides the probable social and economic impacts from the proposed rail line and resulting increased coal mining, the actual construction and operation of the rail line would change the landscape of the Tongue River valley, an area now undeveloped and natural, with few people and isolated ranches.

Traditional Northern Cheyenne and traditional Crow, Arapaho, Oglala and Miniconjou do not conceive of the world in terms of accepted western division of physical versus spiritual impacts. They recognize both types of effects but consider each to be inseparable from the other. For every spiritual effect, there will be a physical consequence and for every physical impact there will be a spiritual consequence. For example, it is believed that the spirits who live in the hills and trees and springs in Northern Cheyenne country have their own daily round of routine activities that they carry out. Also, it is

believed that spirits tend to take the same trails over and over when visiting and these are known as spirit trails. If by mistake someone blocks a spirit trail by building a house or shed on the trail, then a member of the person's family will become ill or some other misfortune will fall on the family. Consequently, traditional people request that elders inspect proposed building sites to make sure construction in the area will not inadvertently disturb any of the spirits living in the immediate area.

Besides a number of unknown burial sites for which location data is lacking, construction of the proposed Extension could disturb seven burial sites which may be located within the project area. However, only general locations of these seven sites have been revealed by Tribal representatives because of the desire to protect the sacred nature of the sites. Accordingly, it is not known at this time if these seven burial sites are actually located within the project area. Exact locations would be made known on a need-to-know basis by Tribal representatives when the ROW is acquired and if the ROW actually includes these grave sites. The general locations of the burials sites are as follows:[23]

T4S R43E - one
T5S R43E - three
T5S R42E - one
T6S R42E - two

Further, the construction of the proposed Extension has the potential to impact an unknown number of cultural resources which have spiritual attributes and/or traditional cultural value. The exact number of cultural resources and sites that would be impacted by the proposed Extension cannot be known prior to an intensive pedestrian survey of the impact area because the vast majority of cultural resources have never been recorded.

Construction and operation of the proposed Extension could disrupt and perhaps permanently change the distribution of "black eagles" (certain hawks and vultures) in the area, specifically the nesting area along the South Brewster Ranch Road in Section 32, T6S R42E and possibly a pair of bald eagles reported to hunt between off-reservation Birney and on-reservation Birney Village. Since it is believed that these birds are messengers between *Maheo* and the Northern Cheyenne, this could be a significant spiritual impact.

The people of Birney Village have a spiritual tie to the East/*Esseneta'he*, who is associated with life and light, the color white, morning light and spring. The relationship of the Sacred Hat Lodge, which contains one of the two covenants sacred to the Northern and Southern Cheyenne, the Sacred Buffalo Hat, could also be disturbed by the proposed railroad construction. The relationship would be disrupted through the modification of the

[23]These listings refer to the grids of the public land survey system developed by the U.S. Geological Survey (USGS) for the United States and can be found on any USGS or BLM map of the area.

landscape by the construction of the railroad and by the noise and air pollution that would be caused by the operation of the line.

The rail line construction could encourage the development of the coal leases immediately east of Birney Village. Coal development could change the spiritual relationship between the Birney people and the environmental setting to such an extent that the traditionalist residents of Birney Village could be forced to leave their lifelong homes. This could constitute a negative social, economic and spiritual impact to these people. The operation of the railroad, and in particular the associated noise and air pollution could interfere with the Northern Cheyenne's current use of the hills around Birney Village for fasts and vision quests. Uninterrupted solitude is necessary to engage in these ongoing religious activities.

Aboriginal Rights

The Northern Cheyenne have raised the issue that lands on the eastern shore of the Tongue River, directly across from the Reservation, were the lands on which the scattered elements of the Northern Cheyenne tribe established homesteads in the 1880's before the reservation was established specifically for them. In particular, the route of the proposed Extension between Hanging Woman and Otter Creeks could cross these early homestead sites. The Northern Cheyenne claim aboriginal title[24] to these lands and argue that it is the ICC's duty as a Federal agency, with broad fiduciary obligations to Native Americans, to clarify the legal status of the homestead claims as part of the permitting process.

The Northern Cheyenne correctly state that the ICC, like other Federal agencies, has a "special relationship" with Native Americans. The Act of March 2, 1899, 25 U.S.C. 312-318, and the Act of February 5, 1948, 25 U.S.C. 323-328 (the "Indian Acts") reflect a Federal policy of avoiding or minimizing disturbance of the Native Americans' quiet possession of their land. However, this does not mean that the ICC should attempt to resolve title claims before deciding whether to grant the construction project, as the Northern Cheyenne request. The ICC's rail construction authority is permissive, and applicants frequently have to obtain easements (or other necessary approvals) before they can construct the line. Moreover, the Commission has rarely, if ever, become involved in investigating title claims. Typically, title issues are resolved in separate proceedings under the laws and policies of the state in which the property is located, after the ICC's approval has been obtained.[25] Where Tribal land is involved, the Department of Interior's Bureau of Indian Affairs may have primary responsibility to resolve title claims.

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[24] "Aboriginal title" is a term of art used to describe an Indian possessory interest in land which Native Americans have inhabited since time immemorial. See Havasupai Tribe v. United States, 752 F. Supp. 1471, 1477-1478 (D. Ariz. 1990).

[25] See Hayfield Northern R. v. Chicago & N.W. Transp. Co., 467 U.S. 622 (1984).

4.13.2 Impacts to the Crow Indian Reservation

Neither the proposed TRRC Extension nor the Four Mile Creek Alternative would cross the Crow Indian Reservation and no Tribal or allotted lands would be acquired for the ROW. Any potential impacts associated with construction of the TRRC Extension are primarily related to the development of coal mines in the project area. The mines that currently exist in Big Horn County, where the Crow Indian Reservation is located, are not expected to grow as a result of construction of the TRRC Extension. Rather, the existing tonnage from those mines may move north over the TRRC, instead of south and then north over the existing BN rail line. Consequently, there would be fewer trains using the existing BN Line through the Crow Indian Reservation.

For the purpose of this analysis, it was assumed that any impacts to the Crow Indian Reservation from the proposed TRRC Extension would be no greater than those projected in the BLM EIS. These potential impacts are generally related to changes in population and the possibility of off-reservation employment. An additional impact to the Crow could be the diversion of traffic from the existing BN rail line through the Reservation to the TRRC rail line.

In its analysis, the BLM assumes that only a small number of non-Native Americans, if any, would settle on the Crow Indian Reservation. This assumption was based on coal-related population impacts, the distance between the Reservation and anticipated developments, the shortage of available housing on the Reservation, and the proximity of large communities that offer an alternative to settlement on the Reservation.

There is no record of Crow in-migration resulting from previous coal development. Furthermore, the majority of Crow Tribal members continue to live on the reservation or in nearby off-reservation communities. The majority of Tribal members living off reservation are employed and are not likely to return. It is thus assumed that in-migration to the Crow Indian Reservation as a result of the construction of the TRRC or its related mining facilities would be negligible.

Crow Tribal members have, however, expressed concern that Crow social services and infrastructure would be stressed by area development, that needed revenue for expansion would not be forthcoming, and that regional expansion would affect Crow culture and increase the risk of alcohol and drug abuse. These issues, as well as employment opportunities associated with the proposed railroad and related mines, are discussed below.

Construction of the proposed Extension or the Four Mile Creek Alternative would result in minor employment opportunities for residents of the Crow Indian Reservation. However, because of the distance between the Crow Indian Reservation and the Montco Mines - the only mines projected to employ new personnel, the Crow share of Native American employment is expected to be smaller than that of the Northern Cheyenne.

TRRC estimates that, during the construction phase, 5 to 25 percent of the 40 percent of the work force projected to be local would be from Lame Deer and Crow Agency. Given the distance between the Crow Indian Reservation and the proposed rail line construction, it is assumed that the majority of the Native Americans hired by the TRRC would be Northern Cheyenne.

Because in-migration to the Crow Reservation is expected to be negligible, few, if any, negative impacts to Reservation infrastructure are expected.

However, as the off-reservation impact population stresses the regional housing market, the inflationary impact could drive Crow Tribal members back to the Reservation. This in turn could exacerbate the Reservation housing shortage as well as other problems such as the delivery of social services.

Demand on Crow Indian Reservation drug and alcohol abuse programs could increase. While the majority of this increased demand would be attributable to natural population increase, increased non-Indian regional population could result in increased drug and alcohol availability and thus increased use by Crow Tribal members. Stress associated with increased exposure to prejudice and contradictory cultural values could also increase Crow drug and alcohol abuse.

Due to increased regional population, the Crow Tribal Police could have to respond to more traffic accidents on reservation roads, more crime associated with drug and alcohol abuse, and more disputes between Native Americans and non-Native Americans. The Tribal Court dockets would be expanded accordingly.

If the increase in off-reservation population results in more alcoholism, drug abuse, and domestic violence, the demand for social services could increase at a rate higher than that required by natural population increase.

The Crow traditional way of life would be most threatened by increased regional population and commensurate increased contact between Crow Tribal members and people with whom they do not share kinship, Tribal membership, language, history, or culture. This increased inter-racial contact could increase Tribal members' exposure to prejudice, alcohol and drugs,and divergent ideas, values, and behaviors.

Increased exposure to prejudice, continued unemployment in the face of regional prosperity, and increased accessibility of drugs and alcohol could result in higher rates of theft, violence, racial conflict, substance abuse, depression, and family violence. These social ills would threaten the members of the Crow Tribe's ability to practice and teach their traditional culture.

4.14 CULTURAL RESOURCES

4.14.1 Introduction

The purpose of the cultural resource analysis of the proposed TRRC Extension is to identify the range of cultural properties in the project area that might be eligible for listing in the National Register of Historic Places. The methodology generally employed in assessing impacts to cultural resources in the 1985 TRRC EIS was used in the analysis of TRRC's preferred alignment and the Four Mile Creek Alternative. The first step was a Class I inventory, or literature search, of all cultural resources previously located in the area of the Extension. A list of any prehistoric, historic or cultural properties (Table 4-46) was prepared by reviewing the following sources: 1) the National Register of Historic Places; 2) the Montana Sites Compendium; 3) the University of Montana Archaeological Site Files; 4) the prehistoric and historic property files housed in the Bureau of Land Management offices in Billings and Miles City, Montana; 5) the prehistoric and historic property files housed in the USDA Forest Service, Custer National Forest, Ashland Ranger District offices in Ashland, Montana; and 6) the Montana State Historic Preservation Office (SHPO) files in Helena. All previous cultural resource surveys completed in the area were reviewed, as well as pertinent historical cartographic records (General Land Office plats and U.S. Geological Survey maps) and recent aerial photographs. All properties in the ROW and within a corridor extending 1500 feet on either side of the alignment have been tabulated for TRRC's preferred alignment and the Four Mile Creek Alternative (Tables 4-46 and 4-47).

Table 4-46. Properties Within the Right-of-Way.

Site No.	Type	Eligibility[1]	Preferred Alignment	Four Mile Creek Alternative
24RB171	RAILROAD GRADE	IN	X	X
24RB217	LITHIC PROCUREMENT	EL	X	X
24RB228	CAMPSITE	EL	X	X
24RB787	BATTLE LOCATION	EL	X	X
24BH1057	LITHIC PROCUREMENT/CAMPSITE	UN	X	
24BH1605	LITHIC WORKSHOP	UN	X	
24BH2317	CAMPSITE	UN	X	
TRR 331	HOMESTEAD	UN	X	X

[1] IN = Ineligible; EL = Eligible; UN = Undetermined

The cultural resource methodology also included 1) limited field reconnaissance to confirm the presence and character of properties; and 2) the use of a predictive model to quantify the potential cultural resource properties along either alignment. Properties

located during the field reconnaissance have been given temporary designations, such as TRR 331. Properties were considered historic on the basis of buildings which appeared to be 50 years old or older and had little or no structural modifications or newer, intrusive buildings. No historical research was undertaken to confirm the age of buildings in the project area.

Table 4-47. Properties Within a 3,000-foot Corridor.

Site No.	Type	Eligibility[1]	Preferred Alignment	Four Mile Creek Alternative
24RB81	LITHIC PROCUREMENT/ WORKSHOP	UN	X	X
24RB155	HOMESTEAD COMPLEX	EL	X	X
24RB156	BURIAL, NON-INDIAN	IN	X	X
24RB208	FARMSTEAD	IN	X	X
24RB210	HABITATION	IN	X	X
24RB213	LITHIC WORKSHOP	IN	X	X
24RB229	CEREMONIAL	EL	X	X
24RB230	CAMPSITE	EL	X	X
24RB232	HABITATION	EL	X	X
24RB242	LITHIC PROCUREMENT	IN	X	X
24RB243	LITHIC WORKSHOP	IN	X	X
24RB247	LITHIC PROCUREMENT	IN	X	X
24RB249	ANIMAL KILL/ PROCESSING SITE	EL	X	X
24RB1209	COAL MINE	IN	X	X
24BH510	BISON KILL SITE	UN	X	
24BH1037	LITHIC WORKSHOP	UN	X	
24BH1517	CAMPSITE	IN	X	
24BH1604	LITHIC WORKSHOP	IN		X
TRR 300	FARMSTEAD	UN	X	X
TRR 301	FARMSTEAD	UN	X	X
TRR 302	CHURCH	UN	X	X
TRR 305	HABITATION	UN	X	X
TRR 306	HABITATION	UN	X	X
TRR 307	HABITATION	UN	X	X
TRR 309	SCHOOL	UN	X	X
TRR 310	HABITATION	UN	X	X
TRR 311	HABITATION	UN	X	X
TRR 313	STORE	UN	X	X
TRR 314	HABITATION	UN	X	X

Table 4-47. Properties Within a 3,000-foot Corridor.

Site No.	Type	Eligibility[1]	Preferred Alignment	Four Mile Creek Alternative
TRR 319	STORE	UN	X	X
TRR 324	HABITATION	UN	X	X
TRR 325	HABITATION	UN	X	X
TRR 326	STORAGE	UN	X	X
TRR 328	HABITATION	UN	X	X
TRR 329	HABITATION	UN	X	X
TRR 330	RANCH COMPLEX	UN	X	X
TRR 332	RANCH COMPLEX	UN	X	X
TRR 333	RANCH COMPLEX	UN	X	X
TRR 334	CATTLE SHED	UN	X	X
TRR 337	RANCH COMPLEX	UN	X	X
TRR 341	FARMSTEAD	UN		X
TRR 343	FARMSTEAD	UN		X
TRR 346	RANCH COMPLEX	UN	X	
TRR 347	FARMSTEAD	UN	X	
TRR 348	CATTLE SHEDS	UN	X	
TRR 349	RANCH COMPLEX	UN	X	
TRR 350	RANCH COMPLEX	UN	X	X

[1] IN = Ineligible; EL = Eligible; UN = Undetermined.

4.14.2 Construction

The construction of TRRC's preferred alignment or the Four Mile Creek Alternative could affect cultural resources by removing cultural properties within the average 200-foot ROW; by visually or audibly impacting properties beyond the ROW but within its 3,000-foot corridor; or by indirectly impacting properties by altering land patterns or by increasing public accessibility to previously remote areas.[26] Impacts to Native American religious sites may also occur by limiting access. The following assessment of impacts to cultural and religious sites has been made pursuant to the Antiquities Act, the National Historic Preservation Act, the National Environmental Policy Act, the Archaeological Resources Protection Act, and the American Indian Religious Freedom Act.

[26] The 3,000 foot corridor was adopted as a standard acceptable to the Montana SHPO while conducting field work for the Tongue River Railroad EIS.

4.14.3 Direct Impacts

4.14.3.1 Prehistoric Properties in the Right-of-Way

Based upon a review of Montana SHPO cultural resource property files and cultural resource inventory reports, construction of either TRRC's preferred alignment or the Four Mile Creek Alternative would affect at least portions of five previously recorded prehistoric properties: 24RB217, 24RB228, 24BH1057, 24BH1605, and 24BH2317 (see Table 4-46). Properties 24RB217, an extensive lithic procurement property, and 24RB228, a small campsite, were determined eligible for listing in the National Register of Historic Places by consensus on August 24, 1982, and have had a data recovery plan to mitigate impact prepared for them. Determinations of eligibility for listing in the National Register of Historic Places have not yet been completed for properties: 24BH1057, a small lithic procurement/campsite; 24BH1605, a moderate sized lithic workshop; and 24BH2317, an extensive campsite. Further work would be required to determine eligibility at these properties. The first two properties are located in the northern portion of the project area, where TRRC's preferred route and the Alternative follow the same alignment. The latter three properties are located along TRRC's preferred route south of where the alternative diverges along Four Mile Creek.

Applying the model developed for the 1985 TRRC EIS to predict the number of prehistoric properties, 20 additional prehistoric properties may be found within the ROW of TRRC's preferred alignment. Using the average rate of eligible-to-ineligible properties portion of the same model, 10 percent (or two) of the properties may be eligible for the National Register. The projected number of prehistoric properties for the Four Mile Creek Alternative is slightly higher at 22, based upon the length of that alignment, and two to three of these may be eligible for the National Register.

The prehistoric properties which might be encountered along the ROW should be similar in type to those previously recorded in the area: lithic procurement, lithic workshop, campsite, and animal (bison) kill and/or processing.

4.14.3.2 Historic Properties in the Right-of-Way

Based upon the search of SHPO property files, report review, and visual reconnaissance for properties in the project area, construction of TRRC's preferred alignment or the Four Mile Creek Alternative would affect all or parts of three known historic properties: 24RB171, 24RB787, and TRR 331 (see Table 4-46). Property 24RB171, an abandoned railroad grade, was determined ineligible for listing in the National Register of Historic Places by consensus and would require no further work. Property 24RB787, a Euro-American/Native American battle site, is designated as probably eligible for listing in the National Register since it is a documented, definable event. Eligibility for National Register listing for property TRR331, a homestead with a partially collapsed house, has not

yet been determined. Further work would be required to make a final determination regarding the eligibility of these two properties.

Using the model developed for the 1985 TRRC EIS to predict the numbers of historic properties, two or three additional historic properties could be found along either alignment. One of those properties could be eligible for the National Register. The field reconnaissance located properties with standing structures. Thus, any additional historical properties are likely to be archaeological in nature. These would probably lack standing structures, but contain foundations, dumps, or features level with or below the ground surface.

4.14.3.3 Potential Impacts to Sacred Sites

Consultation will be initiated with the Northern Cheyenne Tribe and with other concerned tribes as appropriate regarding religious and sacred properties located within or near TRRC's perferred alignment or the Four Mile Creek Alternative. It is expected that this consultation process will continue, as required by the Programmatic Agreement (described below and in Chapter 6), through the various phases of inventory, impact mitigation and construction.

4.14.3.4 Prehistoric Properties Within a 3,000-Foot Right-of-Way Corridor

Twelve prehistoric properties are located within TRRC's perferred alignment 3,000-foot corridor, exclusive of the ROW. These properties include a lithic procurement/workshop; four campsites; three lithic workshops; two lithic procurement localities; and two animal kill/processing locations. Three properties were determined eligible for listing in the National Register by consensus on August 24, 1982. Six of the properties have been determined ineligible for listing in the National Register by consensus, while three have not had determinations of eligibility completed. The unevaluated properties will require further on-site work prior to determining their eligibility. The ineligible properties will not require any further work.

Vibration and audible and visual impacts to cultural resources located in the corridors beyond the ROW could be the most significant impacts to be anticipated. It is not likely that any of the known prehistoric properties would be adversely affected by vibration from construction activities or by related audible impacts. Visual impacts to properties such as campsites would need to be evaluated on a case-by-case basis.

The Four Mile Creek Alternative corridor contains 10 of the previously recorded properties, only one of which (a lithic workshop) is exclusive to this corridor. This property was determined ineligible for the National Register by consensus and will not require any further work.

4.14.3.5 Historic Properties Within a 3,000-Foot Right-of-Way Corridor

Intact historic properties, mainly those with standing structures, are most likely to be impacted by vibration and visual and audible impacts caused by construction activities. The 32 potentially historic properties documented within TRRC's preferred alignment 3,000-foot corridor include: five homestead/farmsteads; seven ranch complexes; eleven residences; one school; one church; two stores; two cattle shed locations; a storage structure; a coal mine; and a grave. Determinations of eligibility have been completed for only four of the historic properties in the extension corridor. One of the four properties, 24RB155 - a homestead complex, has been determined eligible (March 11, 1982) and the remaining three have been determined ineligible for listing in the National Register by consensus. The remaining 28 potentially historic properties have not been given eligibility recommendations due to a lack of historical research and complete recording. The unevaluated properties, one of which is located in the common corridor, will all require research and detailed on-site work prior to formal determinations of eligibility. The consensus ineligible properties will not require any further work. Four of the properties are exclusive to TRRC's preferred alignment corridor.

The Four Mile Creek Alternative 3,000-foot corridor contains 30 historic properties. Again, only four of the properties within the corridor have been subjected to determinations of eligibility, one of which (24RB155) was determined eligible for the listing in the National Register by consensus. The remaining 26 potentially historic properties have not been given eligibility recommendations due to a lack of historical research and complete recording. All unevaluated properties will require research and detailed on-site work prior to formal determinations of eligibility. The consensus ineligible properties will not require any further work. Two of the properties are exclusive to the Alternative corridor.

Structures at the homestead 24RB155, the only National Register historic property, could potentially be adversely affected by vibration from construction activities or by related visual or audible impacts. However, the determination of eligibility was not based upon architectural, structural qualities, nor setting.

4.14.3.6 Native American Properties Within a 3,000-Foot Right-of-Way Corridor

One property (24RB229), located within the common 3,000-foot corridor of the TRRC's preferred alignment and the Alternative, has been tentatively identified as a vision quest site, which could be a sacred Native American property. The property has been determined eligible for the National Register by consensus. It is possible that this property could be impacted by visual or audible impacts caused by construction activities. Impacts to this property would need to be evaluated and an impact mitigation plan would need to be developed and implemented before construction.

A second property of concern to the Northern Cheyenne, located approximately one mile beyond the railroad corridor but on the Northern Cheyenne Reservation, is Birney Village (24RB164). This property was determined eligible for listing in the National Register by consensus. While it is far enough from the corridor that there should be no vibration impact and trees and low hills will likely screen any visible impacts, audible impact could occur to impair undertaking of certain rituals frequently performed by the traditional residents.

4.14.4 Indirect Impacts

The construction of TRRC's preferred alignment or the Four Mile Creek alternative would require changes in current land use patterns, which could result in access to previously remote areas. In such cases, individuals consciously or unconsciously could impact cultural resource or sacred properties by vehicle use and by the casual collection of artifacts. National Register eligible prehistoric, historic, or sacred properties, located within or near the 3,000-foot corridor, could be subjected to this type of indirect impact.

4.14.5 Operation and Maintenance

Vibration from passing trains could impact cultural resource properties as a result of the operation and maintenance of TRRC's preferred alignment or the Alternative. Visual and audible impacts, unless buffered by topography or vegetation, can disrupt the historic association of a property, and, therefore, can affect its National Register eligibility. Prehistoric pictographs, prehistoric petroglyphs, historic properties with standing structures, and religious or sacred properties, where unobstructed view and quiet are required, are the property types most susceptible to this type of impact. While no pictograph or petroglyph properties are known within 1,500 either side of TRRC's preferred alignment, there is one apparent religious or sacred property. In addition, Birney Village on the Northern Cheyenne Reservation, the focus of many traditional rituals, could be subjected to audible, if not visual, impact even though it is beyond the corridor.

Based on what is currently known about the project area, historic properties with standing structures would be most likely to be impacted by the operation and maintenance of the proposed railroad. However, the operation and maintenance impact area should not extend beyond the selected route's 3,000-foot corridor.

Thirty-one potentially historic properties containing standing structures have so far been identified along TRRC's preferred alignment, the Four Mile Creek Alternative and the common corridors. The predictive model developed for the 1985 TRRC EIS indicates that approximately 22 percent (roughly seven properties) of these could be eligible for the National Register.

4.14.6 Consultation and Mitigative Measures

In December 1986 a Memorandum of Agreement was completed between the Advisory Council on Historic Preservation, the Montana SHPO, and the ICC. Following completion of final engineering, the Agreement stipulates how to address archaeological, architectural, historic, and cultural properties which may be effected by the construction of the already-approved line between Miles City and terminal points near Ashland in Rosebud County, Montana. The Agreement includes implementation of survey, identification and evaluation of historic properties; development of a historic properties management plan; development of a treatment plan in consultation with the ICC, Montana SHPO, and other appropriate agencies; and procedures for reviewing and addressing objections and/or disagreements. This Agreement is still active and will apply to the construction of the Ashland to Miles City portion of the line.

The ICC is negotiating a Programmatic Agreement, similar in approach to the earlier Memorandum of Agreement, but pertaining specifically to the proposed Extension between Ashland and Decker and including the Four Mile Creek Alternative. Parties to the Programmatic Agreement include the ICC, the Montana State Historic Preservataion Officer, the Advisory Council on Historic Preservation, and the railroad. In addition, representatives from the Northern Cheyenne will be asked to concur and participate.

CHAPTER FIVE

5.0 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF TRRC'S PREFERRED ALIGNMENT AND THE FOUR MILE CREEK ALTERNATIVE

5.1 LAND USE

The construction of the TRRC's preferred alignment would require the acquisition of 1,248 acres of land, while the construction of the Four Mile Creek Alternative would require 1,356 acres of land. The construction of either rail line also would require another 20 acres for new borrow sites. The removal of these acreages would constitute an unavoidable adverse impact to agricultural production. An additional 80 acres would be affected by the establishment of the two temporary construction camps proposed for the TRRC's preferred alignment or for the Four Mile Creek Alternative.

The construction of TRRC's preferred alignment also would affect two additional land uses: 1) the Tongue River Reservoir State Recreation Area and 2) a recreational development known as Cormorant Bay Estates. The extension ROW would involve the acquisition of 23 of the 580 acres of land within the Tongue River Reservoir State Recreation Area and 8 acres at Cormorant Bay Estates.

5.2 SOCIO-ECONOMIC

Unavoidable socio-economic impacts that are attributed to the operation of the railroad would be limited. Most of the population increases associated with railroad operation would be centered in Miles City, an established community able to absorb railroad-impact population. All four Montana counties would receive positive fiscal benefits from the operation of the railroad.

Unavoidable impacts associated with the Tongue River Railroad would occur to Burlington Northern employees located in Sheridan, Wyoming, and Forsyth, Montana. Individuals working in coal transport for BN may experience job relocations or displacements when BN-transported coal would be rerouted on the proposed Extension. Such actions would translate into unavoidable secondary impacts to Forsyth and Sheridan.

5.3 TRANSPORTATION

The principal unavoidable impact to transportation systems would occur during the operation of railroad and the development of related coal mines. The operation of the railroad would cause vehicle delays averaging slightly over 1 minute at the various train crossings of two county roads, FAS 566 and FAS 314. TRRC's preferred alignment would cross FAS 566 at nine points and FAS 314 at one point. The Four Mile Creek Alternative would cross the northern route of FAS 566 at five points.

Vehicular traffic volumes on the project area's roads and highways would increase as the Ashland-area mines are developed. Increased traffic volumes could result in the disruption of traffic patterns and the degradation of roads and highways. These unavoidable impacts would require improvements to some elements of the transportation system under state, federal or tribal jurisdiction.

5.4 SAFETY

Unavoidable impacts to safety primarily would occur during the operation of the railroad in association with the development of coal mines. Vehicle/train accidents could occur at railroad crossings of the FAS 566 and FAS 314, although the possibility is minimal. Railroad crossings would pose an additional safety hazard since passing trains could delay the response of emergency vehicles to either medical or fire emergencies.

Approximately four derailments are estimated as potentially occurring along either TRRC's preferred alignment or the Four Mile Creek Alternative during the life of railroad operation (1995/96 - 2010).

5.5 SOILS

During construction of either TRRC's preferred alignment or the Four Mile Creek Alternative, wind and water erosion would result in temporary losses of soils. Staging camps, construction sites, topsoil stockpiles, switching facility sites, and the access corridor represent the sites most susceptible to erosion. Soil losses would be reduced by erosion control at these susceptible sites, including reclamation of the ROW and stabilization of the cut-and-fill slopes.

Reclaimed areas contain soils with physical properties different from conditions prior to disturbance. Handling soil would result in such unavoidable impacts as the loss of natural soil profile, altered soil structure, and a loss of organic matter. If a soil's water holding capacity and aeration decreases because of changes in its physical properties, soil-plant relations would be adversely affected.

In addition soil slumping might occur within a small part of either TRRC's preferred alignment or the Alternative. As with soil erosion, slumping potential is of the highest concern where the rail lines cross sensitive soils and where the rail line parallels the Tongue River.

5.6 HYDROLOGY AND WATER QUALITY

According to preliminary findings, TRRC's preferred alignment would cross six possible wetland locations, while the Four Mile Creek Alternative would cross two possible wetland locations. Current Federal administrative policy of "no net loss" of wetlands requires that any wetlands drained or filled by railroad construction would be replaced somewhere within the same general vicinity. Thus, only specific wetland areas would experience unavoidable impacts with rail line construction. The wetlands habitat within the Tongue River hydrologic region would remain the same with the implementation of wetlands mitigation by the TRRC.

The Tongue River would experience unavoidable, temporary increases in suspended sediment and turbidity at bridge construction sites. Sediment loads also would slightly increase when soil disturbed by wind or water erosion at other construction sites entered the stream system. Such temporary impacts, however, would not result in significant changes to long term water quality.

5.7 AQUATIC ECOLOGY

The temporary increases in TSS downstream from bridge construction could result in out-migration of invertebrate and fish populations in the area of the bridges. This unavoidable impact should be temporary. When construction is complete, recolonization of macroinvertebrates and in-migration of fish species would be expected.

TRRC plans to construct a bridge at Hanging Woman Creek, a known spawning area for smallmouth bass and northern pike. If bridge construction occurs at the spawning site during or immediately after spawning season, the two species could lose eggs and fry

present in the spawning area. Scheduling construction to avoid conflicting with spawning periods would mitigate this potential impact.

Aquatic resources also would experience unavoidable impacts if accidental spills introduced toxic materials into the Tongue River. Since accident spills would most likely involve petroleum products, the susceptibility of aquatic organisms to diesel fuel and common solvents would be the major concern.

5.8 TERRESTRIAL ECOLOGY

The construction of TRRC's preferred alignment would directly impact about 637 acres of vegetation, including the associations of pine/juniper, grassland/sagebrush, agricultural, prairie, deciduous tree/shrub, and breaks. The construction of the Four Mile Creek Alternative would directly impact about 781 acres of vegetation, including the above listed associations along with the association of cattail/sedge, also referred to as aquatic.

The loss of vegetation also would represent the loss of wildlife habitat, which in turn could mean the displacement of wildlife. The disturbance of limited acres of deciduous/tree shrub and pine/juniper habitats could temporarily displace deer and pronghorn. Upland birds also could be displaced if rail line construction removes the habitat for sage grouse, pheasant and gray partridge and the habitat and some leks for sharp-tailed grouse. Raptor bird species located in the construction corridor could experience temporary displacement because of the loss of nesting sites and the loss of habitat for raptor prey species.

Additional unavoidable impacts to wildlife attributed to rail line construction include the following: increased "road-kills" due to traffic increases on project area roads; increased recreation pressure by the construction work force; and increased hunting and poaching pressure on deer and pronghorn populations.

Railroad operation would continue to cause some displacement of deer and pronghorn from habitat adjacent to the railroad or accessible to recreationists. Mule deer and white-tailed deer would probably adapt to railroad traffic and continue to use adjacent habitats. This adaptation, however, could result in the unavoidable impact of train-deer collisions. In contrast, pronghorn could be excluded from the ROW by some fencing configurations designed to protect domestic livestock. Pronghorn movements in the area south of the confluence of Four Mile Creek with the Tongue River particularly could be disrupted by ROW fencing.

5.9 AIR QUALITY

Construction activities associated with either TRRC's preferred alignment or the Four Mile Creek Alternative would result in the following temporary increases in air pollutants: 1) increases in particulate matter (TSP) and 10 micron particulates (PM-10) because of wind erosion of disturbed land surfaces; 2) increases in particulate matter (TSP) and 10 micron particulates (PM-10) because of earthwork activities; and 3) increases in particulate matter (TSP), 10 micron particulates (PM-10), sulphur dioxide (SO2), carbon dioxide (CO), hydrocarbons (HC), and nitrogen dioxide (NO2) because of diesel fuel combustion. The levels would diminish considerably at the end of construction and the beginning of railroad operations.

Impacts to the project area's air quality because of train operations would be below applicable federal and state air quality standards. The pollutant concentrations also would be below the Class I increments of the Northern Cheyenne Reservation.

5.10 NOISE

Construction of either TRRC's preferred alignment or the Four Mile Creek Alternative would increase the ambient noise levels in areas adjacent to construction activity. The community of Birney in particular would experience increased levels of noise. Any increases in noise levels, however, would be temporary and last only as long as the construction activity.

Trains operating on the rail line would increase ambient noise levels during the entire period of operations. Some rural residences located within the 65-decibel (DBA) contour line would experience levels of noise identified as intrusive.

5.11 CULTURAL RESOURCES

The construction of TRRC's preferred alignment would directly impact portions of five recorded prehistoric properties, while the construction of the Four Mile Creek Alternative would impact two of the same five properties. Two of the five prehistoric sites have been determined eligible for listing in the National Register of Historic Places; the remaining three sites would require completion of determinations of eligibility. In addition, the construction of either TRRC's preferred alignment or the proposed Alternative would affect three known historic properties, two of which would require determination of eligibility, and one which has been determined ineligible for listing in the National Register.

Impacts to any sites determined eligible for the National Register could be mitigated through appropriate data recovery procedures.

The land use changes associated with the railroad and related coal mine development could result in access to previously remote areas. Individuals might indirectly impact cultural resources or sacred properties by vehicle use and by artifact collection.

5.12 NATIVE AMERICANS

It is important to note again that there are varying viewpoints among the Northern Cheyenne and Crow regarding the effects and impacts from the proposed rail line and associated increased mining activity and development. The differing viewpoints generally pertain to the potential economic benefits to the Reservation from these activities, and the potential negative impacts from these activities to the traditional way of life practiced by a number of residents on the Reservations.

The construction and operation of the proposed line and associated increased development could cause some unavoidable adverse impacts to both Reservations, partiacularly to the Northern Cheyenne Indian Reservation. Adverse impacts could occur to the infrastructure, social organization and social well-being of both Reservations. There could also be a loss of cultural and ethnic identity and a decreasing emphasis on traditional values. Both Reservations could become more culturally diverse.

Increasing regional population growth and the possible increase of non-Native American residents on the Northern Cheyenne Indian Reservation could lessen the feeling that the Reservation is a homeland for Northern Cheyenne.

Spiritual as well as cultural impacts could occur. For the Northern Cheyenne who hold the fundamental belief in the inseparable relationship between the physical and spiritual, the impacts from the changing surrounding landscape associated with rail operations, coal mining and increased development would represent an irreversible spiritual loss. Increasing development could also lead to loss of privacy and seclusion necessary for religious practices. And the Northern Cheyenne who enjoy the rural lifestyle and/or isolation on the Reservation could find their lives changed by the rail construction and operations, and by increasing development and population, particularly in the Ashland and Birney Village areas.

Similarly, for the Crow who hold traditional beliefs, the increasing coal mining the region could irreversibly and adversely impact sites with sacred attributes or ethnic significant. Further for traditional Crow members, a reduction of land and the change of the natural environmental surroundings from mining could represent a loss in a major source of inspiration and a loss of privacy for religious activities.

CHAPTER SIX

RECOMMENDED MITIGATION AND REQUEST FOR COMMENTS

Tongue River Railroad Company (TRRC) proposes to construct and operate a 41-mile rail line from Ashland to Decker, MT (the proposed Extension). As previously discussed, this 41-mile rail line would extend from TRRC's already-approved, but not yet built, 89-mile rail line from Miles City to Ashland, MT (the Miles City/Ashland line). TRRC plans to construct the proposed Extension along a route generally paralleling the Tongue River. TRRC has proposed one alternative, the Four Mile Creek Alternative, which is the only alternative that appears feasible because of the surrounding terrain.

At this stage of the environmental analysis, the Section of Energy and Environment (SEE) preliminarily concludes that the Four Mile Creek Alternative would be more environmentally advantageous than TRRC's preferred alignment. The Four Mile Creek Alternative would avoid construction and operation near the Tongue River Dam and would avoid disturbing an environmentally sensitive section of the Tongue River near the Tongue River Reservoir. Also, it would eliminate the need to construct five bridges and a tunnel. In addition, the Four Mile Creek Alternative would avoid impacts to the Tongue River Reservoir State Recreation Area and the Cormorant Estates. We note that, because of the topography and grade, TRRC has indicated that construction and operation may be more costly than TRRC's preferred alignment and there may be increased safety concerns. SEE specifically invites comments on its preliminary conclusion regarding the environmental preferability of the Four Mile Creek Alternative.

The following discussion addresses the two mitigation approaches which SEE recommends that the ICC adopt as conditions to any decision approving the construction and operation of TRRC's proposed Extension.

I. TRRC's Mitigation Plan for the Proposed Extension from Ashland to Decker

TRRC has initiated, developed, and committed to undertake an extensive and detailed mitigation plan that addresses the potentially significant environmental impacts associated with the proposed Extension. This proposed mitigation plan is set forth in Appendix A. Specifically, this plan is designed to mitigate environmental impacts in the following areas: (1) Land Use; (2) Social and Economic; (3) Transportation; (4) Air Quality; (5) Noise; (6) Safety; (7) Hydrology and Water Quality; (8) Aquatic and Terrestrial Ecology; and (9) Cultural Resources.

Native American concerns are addressed within the aforementioned impact categories, where appropriate. For example, with respect to cultural resources, TRRC states that in the preparation of any cultural resource inventory, TRRC will invite representatives from the Northern Cheyenne Tribe to identify and compile a list of traditionally-important plants that occur in the area of potential effect as well as the gathering sites and access points for these plants. TRRC then states that the information provided by the Tribal representatives regarding plant species and locations will be used by TRRC in considering the need to protect and assure continuing access to these plants. With respect to socio-economic issues, TRRC has stated that it would appoint a liaison between TRRC management and the Northern Cheyenne Tribe to assist in ensuring that Tribal members receive an equal opportunity to secure temporary construction and full-time operational jobs with TRRC.

TRRC's mitigation plan for the proposed Extension addresses environmental impacts that are common to both the Four Mile Creek Alternative and TRRC's preferred route. This plan also includes certain mitigation measures that are specific to TRRC's preferred route (i.e., the 10 mile segment of TRRC's preferred route that would be circumvented by the Four Mile Creek Alternative). [1] At this stage, SEE considers the mitigation plan to be adaptable to either route should the ICC approve construction and operation of the proposed Extension. We specifically invite comments on the scope of TRRC's proposed mitigation plan.

TRRC's mitigation plan for the proposed Extension is similar to the master mitigation plan that was adopted in the ICC's decisions of September 1985 and May 1986, which approved the construction and operation of the Miles City/Ashland line.
The Miles City/Ashland mitigation plan is included in the final EIS for that rail line and the Commission's initial decision served September 4, 1985 as Appendix B, "A Master Mitigation Policy And Plan for the Proposed Tongue River Railroad Project."

Although similar in scope to the Miles City/Ashland mitigation plan, there is a new feature in TRRC's mitigation plan for the proposed Extension. TRRC's mitigation plan for the proposed Extension discusses the formation of an informal Multi-agency/Railroad Task Force. The purpose of the proposed task force is to coordinate the implementation of the mitigation measures addressing terrestrial and aquatic impacts, facilitate the exchange of information, and enhance the ability of the affected agencies to work together.
TRRC and the following agencies have informally agreed to participate in this task force: Interstate Commerce Commission, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, Montana Department of Fish, Wildlife and Parks, and Montana Department of State Lands. The ICC would act as lead agency in this task force.

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[1]This 10-mile segment involves the 2-3 miles of the river just north of the Tongue River Dam and the construction of five bridges and the tunnel.

II. Programmatic Agreement or Other Appropriate Cultural Resource Mitigation Consistent with the National Historic Preservation Act (NHPA) and the American Indian Religious Freedom Act (AIRFA).

The ICC is currently negotiating a Programmatic Agreement (PA)[2] for the proposed Extension which is similar to the Memorandum of Agreement that was executed for the Miles City/Ashland line.[3] This PA would address the effects of the proposed Extension on historic/cultural resources that are either listed or eligible for listing in the National Register of Historic Places (National Register). Parties to the PA would include the ICC, the Montana State Historic Preservation Officer, the Advisory Council on Historic Preservation, and TRRC. Representatives from the Northern Cheyenne Tribe would be asked to concur and participate. Other Tribes would be invited to participate where appropriate. In addition, the U.S. Department of Interior, Bureau of Indian Affairs and the Bureau of Land Management would be asked to concur.

Essentially, the PA would require that TRRC, under the supervision of an independent, qualified professional and prior to undertaking any construction, prepare an inventory of the area of potential effect in order to identify cultural resources which are listed or eligible for listing in the National Register. The parties to the PA would then consult in the preparation of a "Treatment Plan" to determine appropriate measures to mitigate or negate potential effects to any eligible resources. In addition, if previously undiscovered resources are encountered during construction, then reasonable efforts would be required to avoid or minimize harm to these resources until TRRC could evaluate and if necessary mitigate any impacts. This evaluation and mitigation would be carried out in consultation with appropriate parties.

With respect to Native American concerns, the PA seeks the participation of the Northern Cheyenne tribe and other affected Native Americans. The PA specifically invites the participation of Northern Cheyenne representatives to assist in the cultural resource inventory in order to identify, document, and evaluate properties of spiritual and cultural value to Native Americans. Moreover, if such resources are identified, affected Native Americans would be consulted regarding the appropriate mitigation for these resources.

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[2]The Programmatic Agreement is entitled "Programmatic Agreement Between the Interstate Commerce Commission, the Montana State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Construction and Operation of the Ashland to Decker Portion of the Tongue River Railroad Company."

[3]In 1985, the ICC, TRRC, the Advisory Council on Historic Preservation, and the Montana State Historic Preservation Officer signed this Memorandum of Agreement to mitigate potential impacts to cultural resources from construction and operation of the Miles City/Ashland line.

The PA currently is being refined to reflect the comments of all affected parties, including the Northern Cheyenne Tribe.[4] When the appropriate revisions have been completed, the PA will then be circulated to the parties for formal approval and signature. If for any reason the PA is not executed, then other mitigation measures will be developed with the appropriate parties to ensure protection of cultural/historic resources consistent with NHPA and AIRFA.

III. Recommendations

Based on our independent analysis of the project; the comments from various governmental and private agencies, Native Americans, and other interested parties; TRRC's proposed mitigation, and the measures contained in the Programmatic Agreement, SEE recommends that any ICC decision approving the proposed construction and operation be subject to (1) TRRC's Mitigation Plan for the Proposed Extension (Appendix A) and (2) an executed Programmatic Agreement or, in the event the PA is not executed, other appropriate mitigation to protect cultural/historic resources consistent with Section 106 of the National Historic Preservation Act and the American Indian Religious Freedom Act.

With respect to potential socio-economic impacts to the Northern Cheyenne Reservation, TRRC and related coal mining companies are encouraged to hire Native Americans where possible. In addition, we note that the Northern Cheyenne's desire to increase employment may relate more to coal mining than to railroad construction and operation and suggest that the affected Native Americans may be able to negotiate directly with the coal mining companies.

IV. Request for Comments

We invite comments on all aspects of this draft EIS. Also, we specifically invite comments on our preliminary determination that the Four Mile Creek Alternative is the environmentally preferable route, impacts to Native Americans, and the scope and adequacy of the recommended mitigation. Comments [an original and 10 copies, with reference to Finance Docket 80136 (Sub No.2)] regarding this draft EIS should be sent to to Dana White, Section of Energy and Environment, Room 3214, Interstate Commerce

[4] The PA has been circulated to and reviewed by all the affected parties, including the Northern Cheyenne, to ensure that the PA addresses their respective concerns and reflects their specific suggestions, where appropriate.

Commission, Washington, D.C. 20423. Questions may also be directed to Ms. White at this address or by telephoning (202) 927-6214.

One copy of the comments should also be sent to TRRC's representative: Thomas Ebzery, Village Center I, Suite 165, 1500 Poly Drive, Billings, MT 59102

Date Made Available to the Public: July 17, 1992

Comment Due Date: September 21, 1992

APPENDIX A